TECHNOLOGY DEPT.

Gas Journal

Vol. 272. 104th Year. LONDON, DECEMBER 3, 1952. No. 4670. Price 1/3

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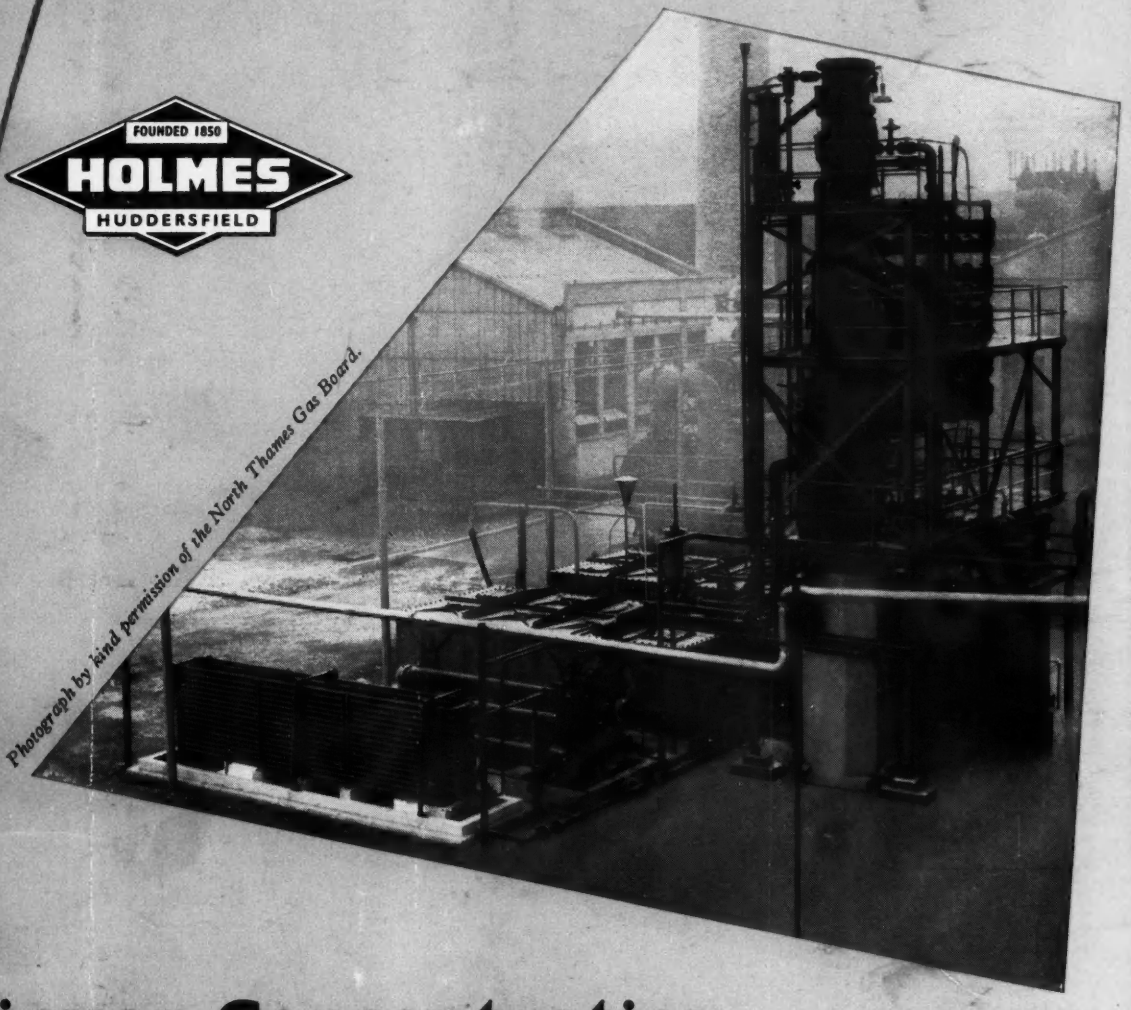

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Liquor Concentration

A recent plant to treat 7200 gallons per day of raw liquor with heat exchange between raw and stripped liquors.

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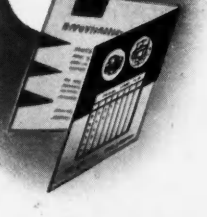

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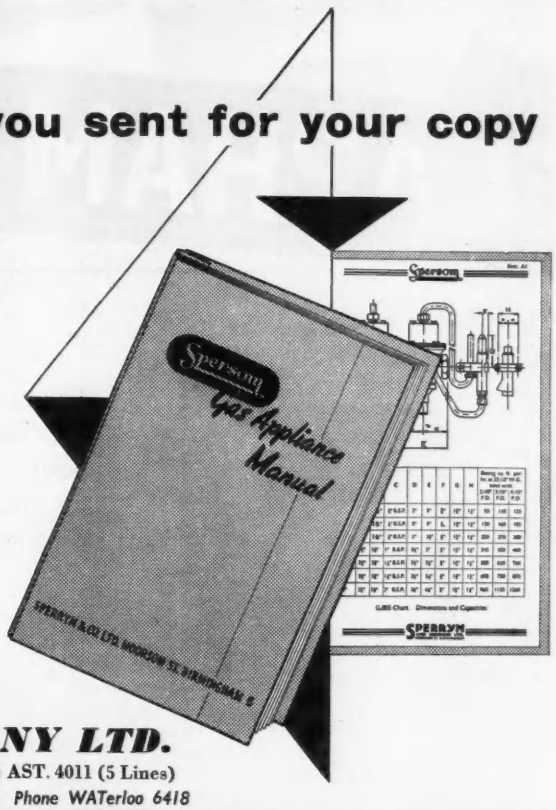

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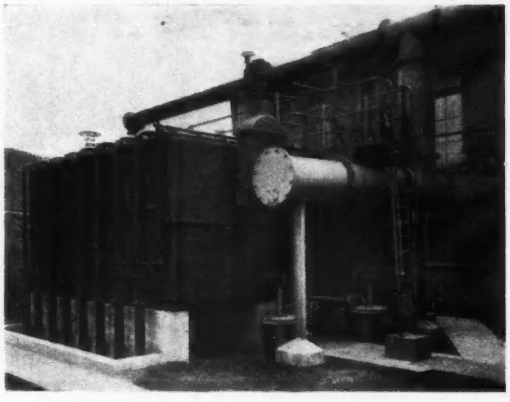

Two Clapham-Barwick Pumpless Static Ammonia Washers

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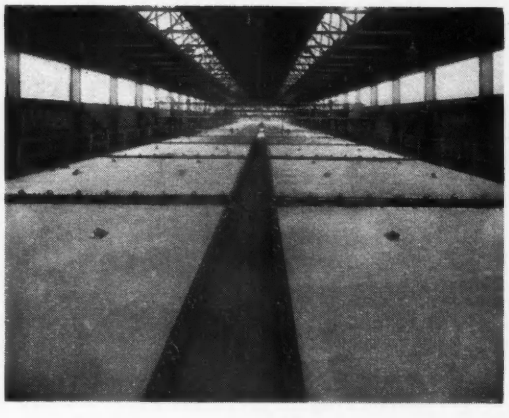
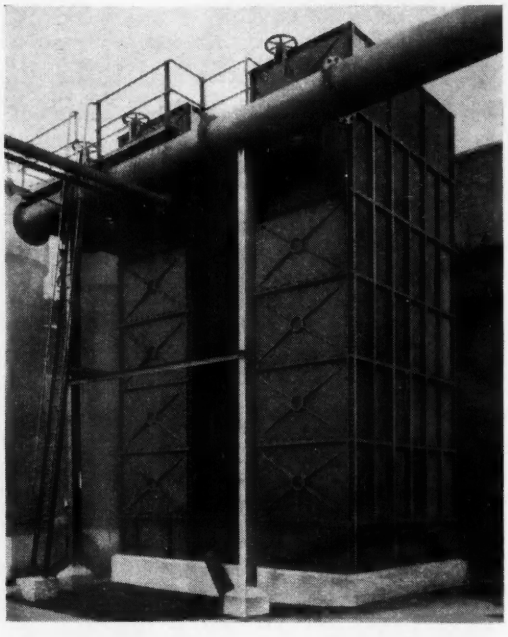


Internal deck level view of the Purifier Installation (Eight 45 Feet Square Boxes)



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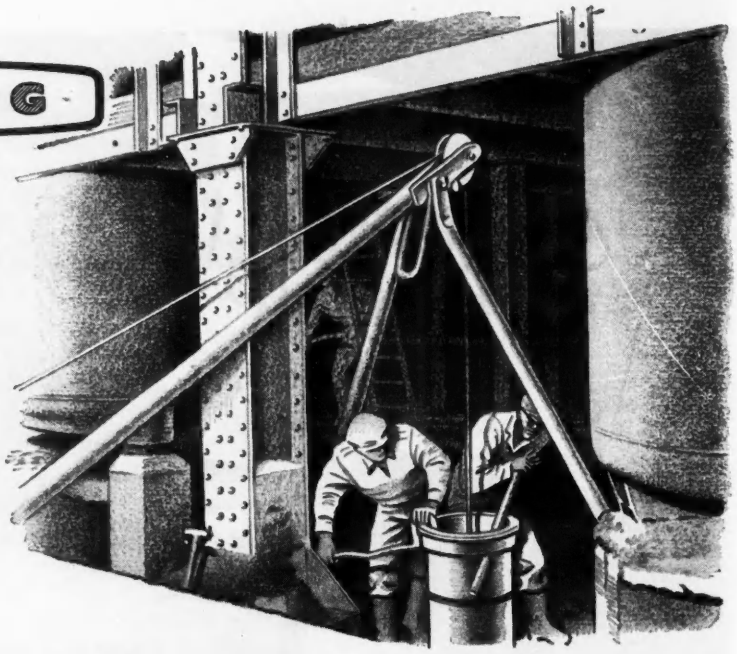

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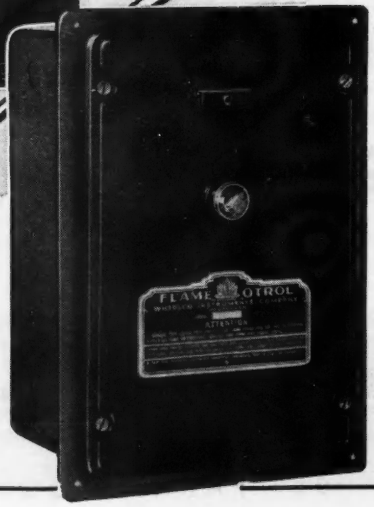

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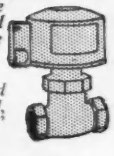

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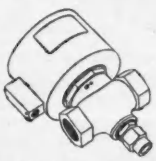

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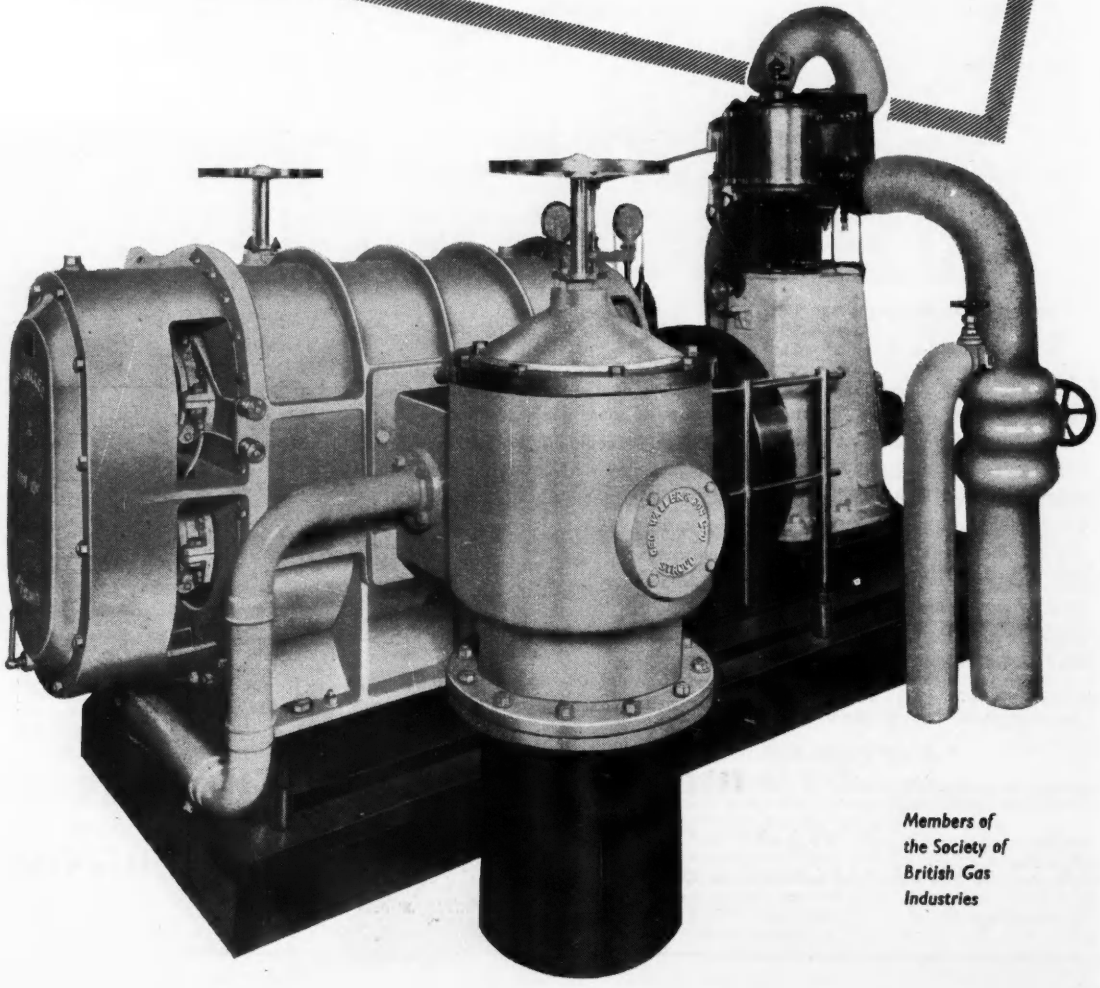

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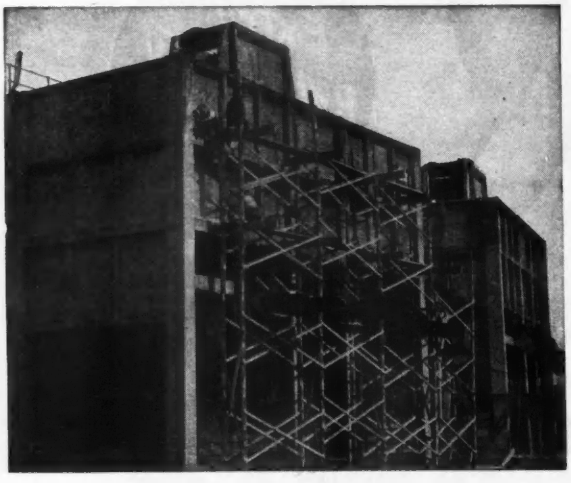

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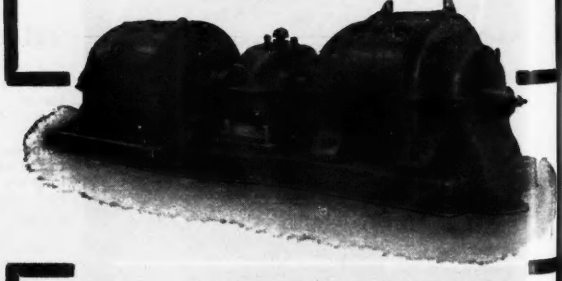

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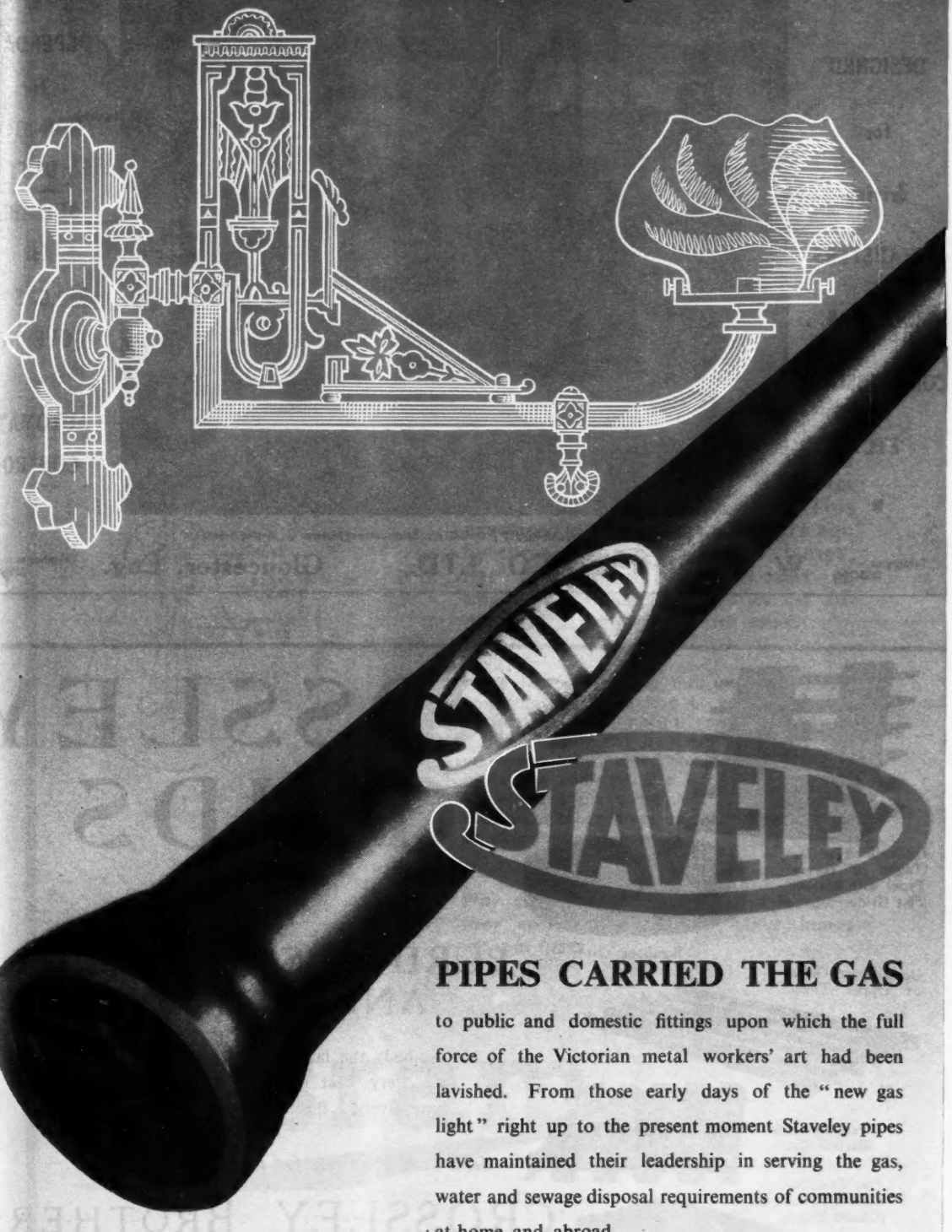

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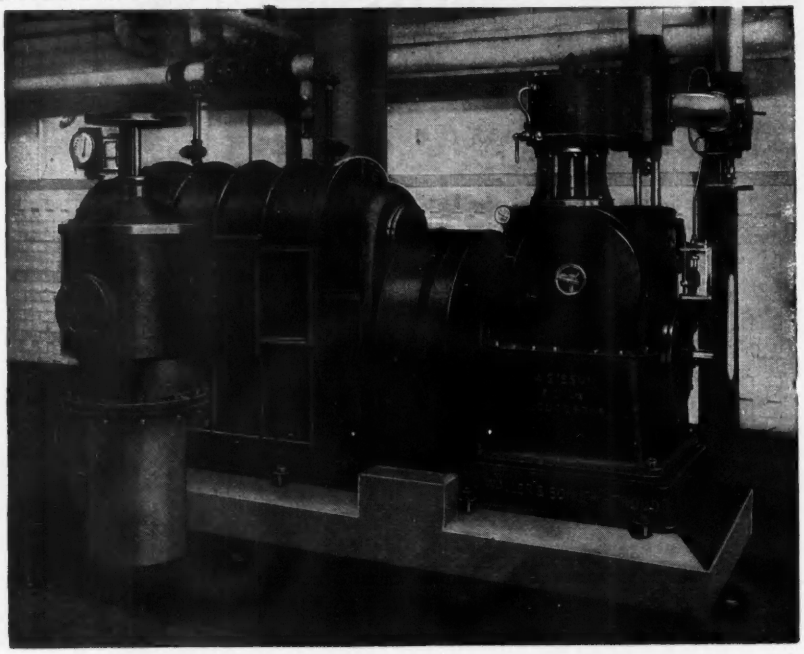

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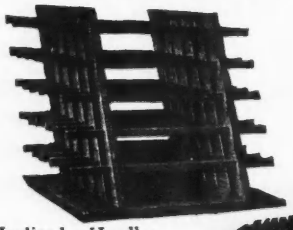

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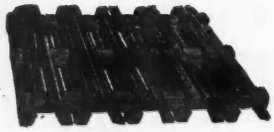

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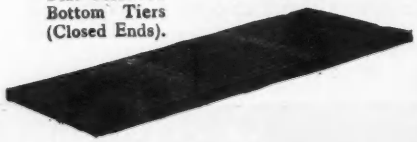

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ALL FITTED WITH FUSES

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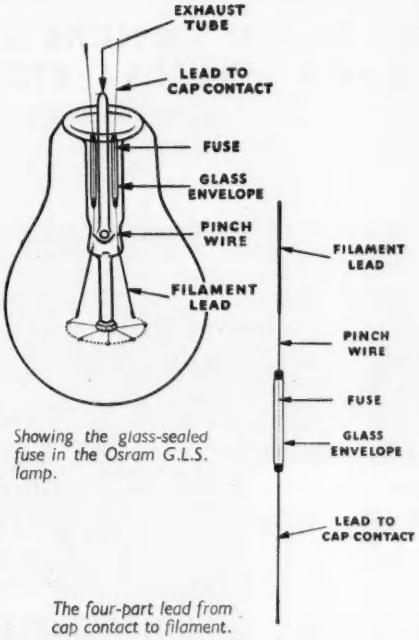

Showing the glass-sealed fuse in the Osram G.L.S. lamp.

The four-part lead from cap contact to filament.

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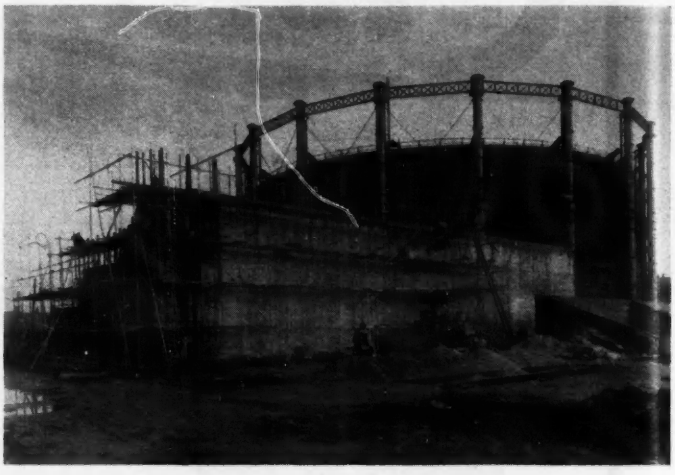

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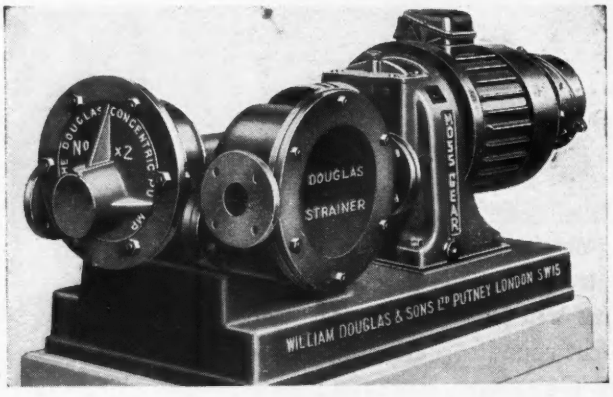

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the most luxurious and effective gas cooking instrument of our times
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To the end of the year, full-page advertisements like this one are in all these magazines: Punch, Good Housekeeping, Sphere, Illustrated London News, House & Garden, Homes & Gardens, Ideal Home, Woman's Journal.

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ONE MAN AND HIS STACKER . . .

he loads with it

1

Tows it

2

Unloads with it

3

It is amazing what one man can do when he has a C. & T. Light Mobile Stacker to help him. The photographs show one of these versatile, roadworthy machines loading waste firebricks into a lorry (photo 1), then being towed to a railway siding (photo 2) to discharge the bricks into a railway wagon (photo 3). The entire job is carried out quickly and simply—a much more efficient method than laboriously throwing the bricks into the vehicles. (Photographs by courtesy of Thomas Mouget and Co. Ltd., Contractors, Middlesbrough.)

The C. & T. Light Mobile Stacker is available in four sizes with maximum delivery heights between 10 ft. 8 in. and 18 ft. At minimum elevation the exceptionally low overall height allows easy access to all parts for maintenance. Drive is electric, diesel or petrol.

Stacking coal in a cellar within 2 ft. of the ceiling . . . a faster, less costly method than barrowing and shovelling as done previously. (Photograph by courtesy of Jowett Cars Ltd., Bradford)

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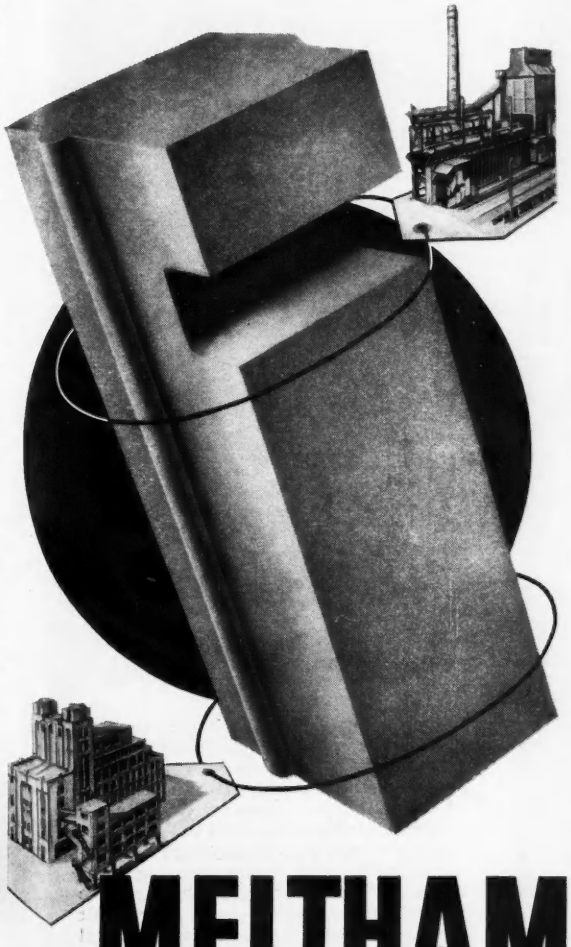

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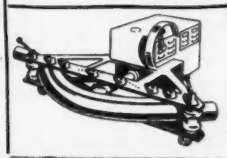
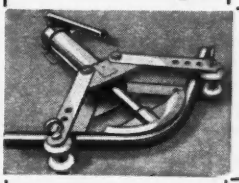
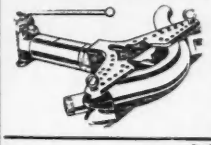
Staffa BENDERS FOR EVERY TUBING JOB!



STAFFA 4" HAND and MOTORISED HYDRAULIC BENDERS (Patented)
Portable, capable of handling steam and gas tubes from ⅜" to 4", cold and unloaded. 3-way valve controls double-acting ram, giving infinite control. Motorised units supplied for any electrical supply. Patent automatic "take off" arms provided, to eject tube from centre former after bending.



STAFFA TUBEMASTER HYDRAULIC BENDER
Single stage pump. Portable-folding wing-head. steam and gas tubes: ⅜", ½", ¾", 1", 1¼" and 1½". Electric: ¾", 1", 1¼" and 1½". Full 90° bend.



STAFFA 2-STAGE PORTABLE OIL HAND HYDRAULIC BENDER (Patent No. 597,228)
With attachments, will bend: steam and gas tubes—⅜" to 3" nom. bore. Electrical conduit—up to 2" O.D. Flat bars—up to 4" x ½". R.C.—up to 1½" dia. Copper tubes—up to 3" dia. Motorised model available.

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3" OPEN TYPE HYDRAULIC BENDER. Bends all classes of steam and gas tubes, from ⅜" to 3" bore.

Formers for ⅜", ½", ¾", 1", 1¼", 1½", 2", 2½" and 3" tubes. Open type wing-head for easy bending of prefabricated pipework.

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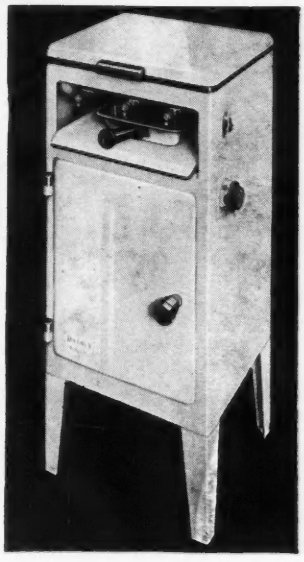
For small Kitchens and Flats...

The

Dainty

MINOR



This efficient little cooker of large capacity is made especially for small kitchens and flats.

Its cast iron construction ensures durability and low maintenance cost.

For hire purchase or for simple hire. The 'Dainty' Minor is ideal.

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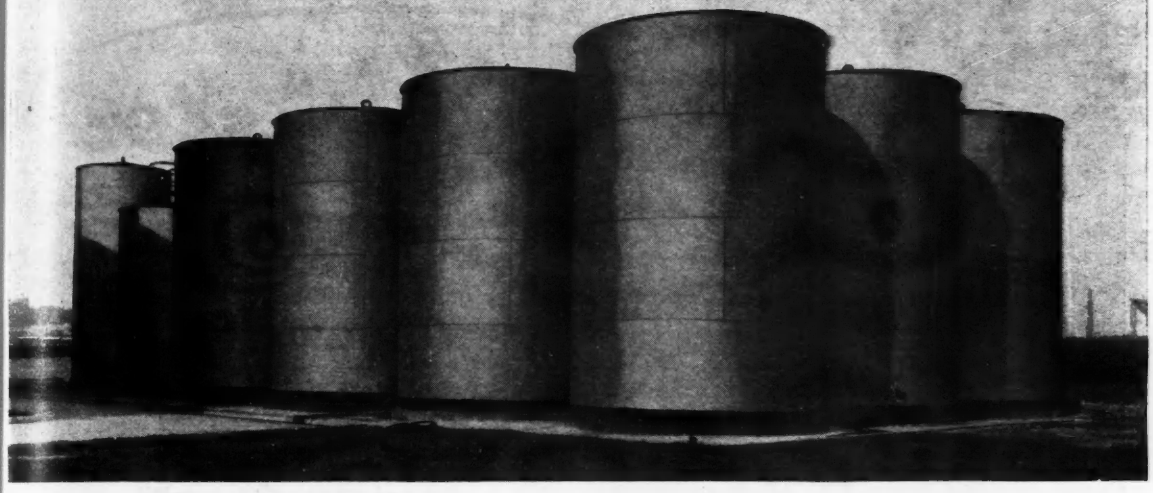
INDIVIDUAL TANKS UP TO 2,000,000 GALLONS CAPACITY



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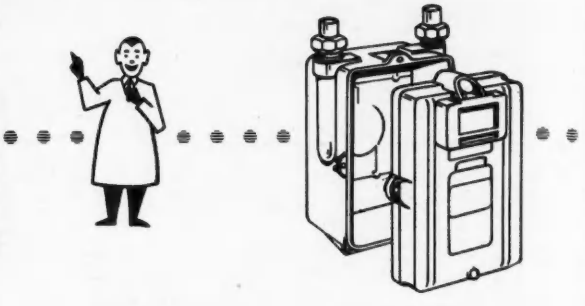
with new
two-part case



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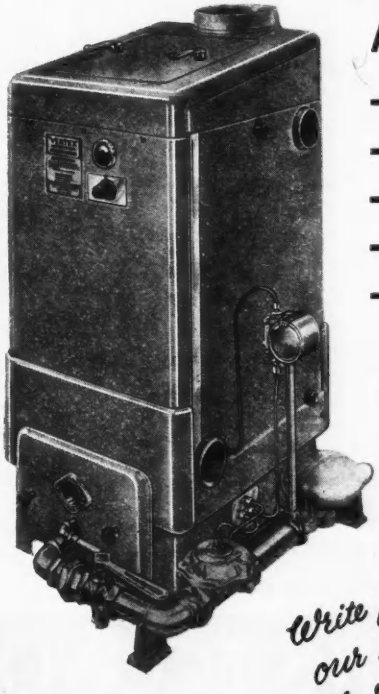

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No. 2	160,000	3' 9"	2' 6"	1' 10"
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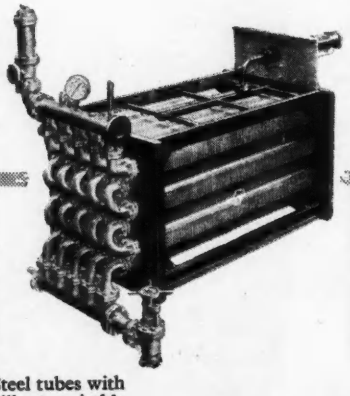
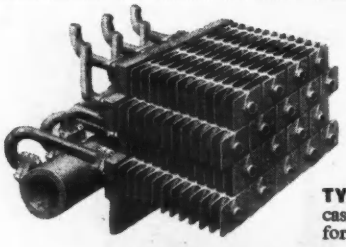


VERTICAL TUBE TYPE Cast-iron vertical tubes : for a great variety of applications.



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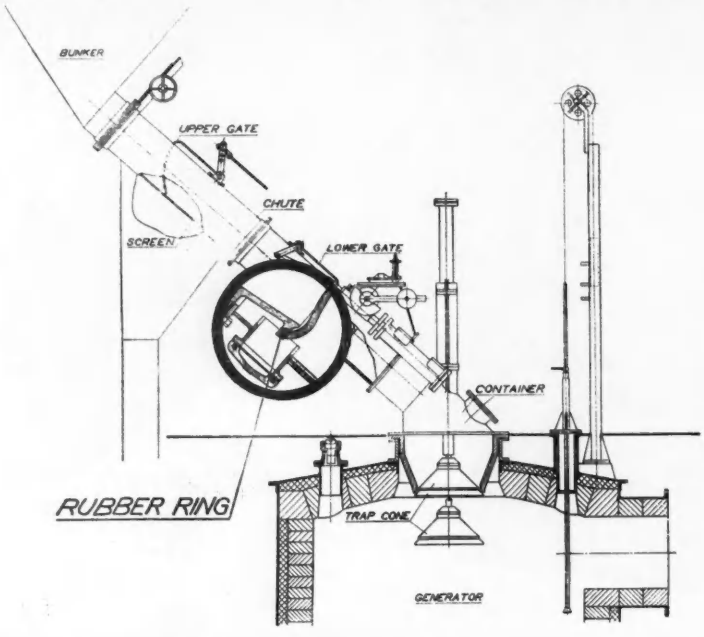

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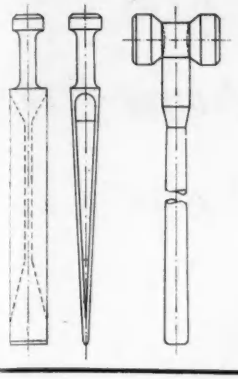

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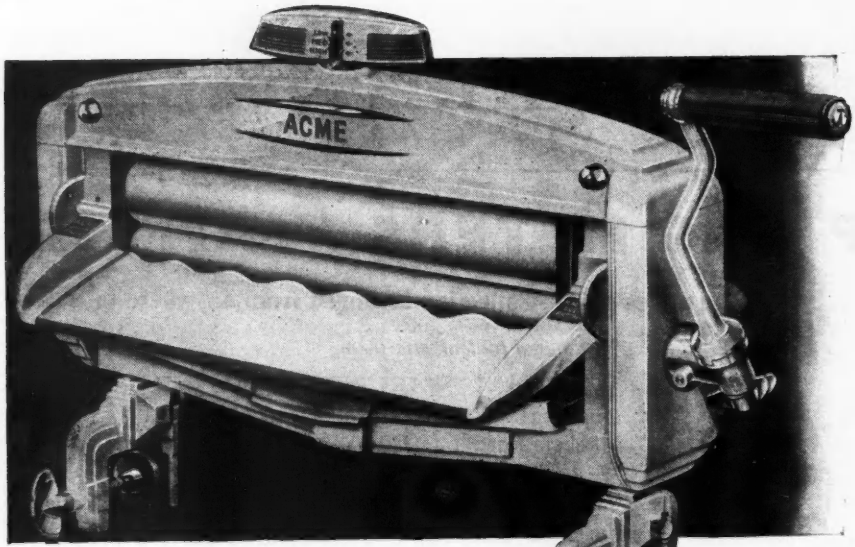

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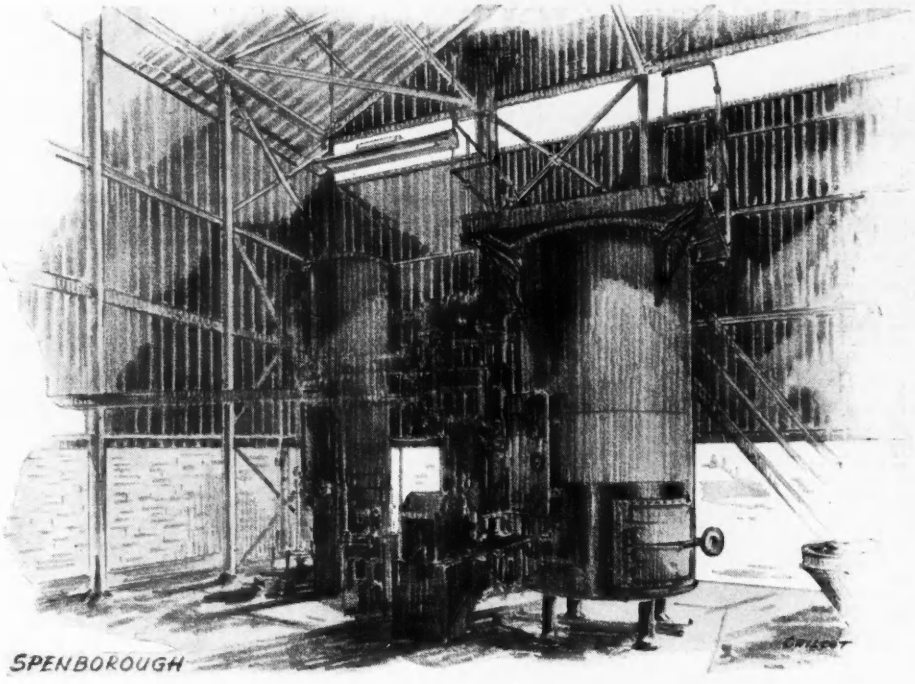
INDEX TO 'JOURNAL' ADVERTISERS

	PAGE
A	
A.C.E. Machinery, Ltd.	
Abbott, Birks & Co., Ltd.	
Accurate Recording Instrument Co.	S2
Acme Wringers, Ltd.	548
Aerogen Co., Ltd.	
Aerograph Co., Ltd.	
Alder & Mackay, Ltd.	
Allan Taylor (Engineers), Ltd.	
Ascot Gas Water Heaters, Ltd.	
Ascot Gas Water Heaters, Ltd. (F.A. Neat)	
Ashmore, Benson, Pease & Co.	
Ashworth, Thos., & Co., Ltd.	
Aspinall's (Paints), Ltd.	S4
Associated Lead Manufacturers, Ltd.	
Associated Lead Manufacturers, Ltd. (Rustodian)	
Autocontrol Boilers Ltd.	543
Automatic Telephone & Electric Co., Ltd.	
Automotive Products, Ltd.	
Averill, C. R., Ltd.	
B	
Bailey, Sir W. H., & Co., Ltd.	
Bale & Church, Ltd.	S3
Balfour, Henry, & Co., Ltd.	546
Begwaco Meters, Ltd.	542
Bell's Asbestos & Engineering, Ltd.	
Benham & Sons, Ltd.	
Blakeley, Firth, Sons & Co., Ltd.	
Bolton's Superheater & Pipe Works, Ltd.	
Booth, John, & Sons (Bolton), Ltd.	541
Boydell, E., & Co., Ltd.	
Bratt Colbran, Ltd.	
Bray, George, & Co., Ltd.	
Bray, W. E., & Co., Ltd.	529
Bright, Son & Co. (Clerkenwell), Ltd.	
Bristol's Instrument Co., Ltd.	
British Flint & Cerium Manufacturers, Ltd.	
British Gas Purifying Materials Co.	S3
British Industrial Products	
British Iron & Steel Federation	
British Oxygen Co., Ltd.	
British Rothotherm Co., Ltd.	
British Thermostat Co., Ltd.	
British Thomson Houston, Ltd.	
British Tyre and Rubber Co., Ltd.	
British Vacuum Cleaner & Engineering Co., Ltd.	
Broadbent, Thomas, & Sons, Ltd.	
Brockhouse Heater Co., Ltd.	578
Broom & Wade, Ltd.	
Brotherhood, Peter, Ltd.	
Brown, J., & Co., Ltd.	
Bugden, Thos., & Co.	
C	
Cambridge Instrument Co., Ltd.	
Cannon (Holdings), Ltd.	
Carron Co.	
Cementation Co., Ltd.	526
Central Manufacturing & Trading Co. (Dudley), Ltd.	
Chamberlain Industries, Ltd.	539
Chaseside Engineering Co., Ltd.	
Chemical Engineering Wiltons, Ltd.	
Chemical & Insulating Co., Ltd.	
Cinema-Television, Ltd.	
Clapham Bros., Ltd.	524
Clayton, Son & Co., Ltd.	
Clifford Engineering Co., Ltd.	S2
Cochran & Co., Annan, Ltd.	
Cohen, George, Sons & Co., Ltd.	
Collins, Thomas, & Co., Ltd.	
Concrete Proofing Co., Ltd.	530
Consolidated Pneumatic Tool Co., Ltd.	
Cort, Robert, & Son, Ltd.	
Coventry Chromium Plating Co., Ltd.	
Cowper Penfold & Co., Ltd.	
Cox & Danks, Ltd.	
Crane, Ltd.	S2
Crone & Taylor, Ltd.	538
Crosby & Co., Ltd.	
Crosslands (Rugeley), Ltd.	
Crossley Bros.	532
Curtis, A. L., & Co.	
Cutler, Samuel, & Sons, Ltd.	578
D	
Davey, Paxman & Co., Ltd.	
Dawe Instruments, Ltd.	
De la Rue, Thomas, & Co., Ltd. (Potterton Gas Group)	
Demolition & Construction Co., Ltd.	
Dempster, R. & J., Ltd.	
Dempster, Robert, & Sons, Ltd.	
Derbyshire Silica Firebrick Co., Ltd.	
Dexion, Ltd.	
Diaphragm & General Leather Co., Ltd.	
Dick, R. & J., Ltd.	
Donkin (The Bryan) Co., Ltd.	Cover II
Douglas, Robert M., (Contractors), Ltd.	534
Douglas, William, & Sons, Ltd.	536
Drakes, Ltd.	
Drew, H. B., Ltd.	
Dunlop & Ranken, Ltd.	
E	
E.B. Refractory Cement Co., Ltd.	
Edgar, William, & Son, Ltd.	
Elcontrol, Ltd.	
Electroflo Meters Co., Ltd.	
Electrolux, Ltd.	
Elliott Bros. (London), Ltd.	
English Electric Co., Ltd.	
Ether, Ltd.	526
Evershed & Vignoles, Ltd.	
Evode, Ltd.	
Ewart Chainbelt Co., Ltd.	S2
Ewart & Sons, Ltd.	
Expanded Metal Co., L d.	

	PAGE
F	
Falk Stadelmann & Co., Ltd.	
Fibreglass, Ltd.	
Flavel, S., & Co., Ltd.	570
Fluxite, Ltd.	
Four Oaks Spraying Machine Co., Ltd.	544
Fowler, John, & Co. (Leeds), Ltd.	
Franki Compressed Pile Co., Ltd.	
Fraser & Chalmers, Engineering Works	
Fry's Metal Foundries, Ltd.	
Fyffe & Co., Ltd.	
G	
Gas Chambers & Coke Ovens, Ltd.	
Gas Purification & Chemical, Ltd.	S3
General Descaling Co., Ltd.	
General Electric Co., Ltd.	533
General Gas Appliances, Ltd.	537
Gibbons Bros., Ltd.	
Gibbons (Dudley), Ltd.	
Gibson, John, & Son, Ltd.	
Glover, George, & Co., Ltd.	523
Glover, Thomas, & Co., Ltd.	552
Godfrey, Sir George, & Partners (Industrial), Ltd.	541
Goodall Clayton & Co., Ltd.	
Goodyear Mechanical Goods	574
Grant & West, Ltd.	
Graphite Products, Ltd.	
Green, E., & Son, Ltd.	544
Green & Boulding, Ltd.	
Gunite Construction Co., Ltd.	S2
H	
Hamilton, A. H., & Co., Ltd.	
Hardman & Holden, Ltd.	
Harris & Pearson, Ltd.	
Harris Engineering Co., Ltd.	
Harrisons (London), Ltd.	
Harvey, G. A., & Co. (London), Ltd.	
Hawkins, W. T., & Co.	S2
Hewitt Construction Co., Ltd.	
Hickson's Timber Impregnation Co. (G.B.), Ltd.	
Hilmor, Ltd.	
Holden & Brooke, Ltd.	
Holmes, W. C., & Co., Ltd.	Cover I, S5
Honeywell-Brown, Ltd.	
Horseley Bridge & Thomas Piggott, Ltd.	
Horstmann Gear Co., Ltd.	
Howden, James, & Co., Ltd.	
Hughes, F. A., & Co., Ltd.	
Humphreys & Glasgow, Ltd.	550
I	
Ideal Boilers & Radiators, Ltd.	
I.C.I., Ltd. (Metals Division)	
Ingham, John, & Sons, Ltd.	
International Combustion, Ltd.	
J	
Jeavons, E. E., & Co., Ltd.	
Jeavons Engineering Co.	536
Jenkins, W. J., & Co., Ltd.	
Johnson, C. H., (Machinery), Ltd.	547
K	
Keay, E. C. & J., Ltd.	S1
Keith Blackman, Ltd.	S6
Kerr, John, & Co. (M/C), Ltd.	
King, Geo. W., Ltd.	
King, Walter, Ltd.	S3
Kings Patent Agency, Ltd.	S4
Kirk & Co. (Tubes), Ltd.	543
Kirkham Hulett & Chandler, Ltd.	
Kleenoff Co.	
Klinger, Richard, Ltd.	
L	
Laidlaw, R., & Son (Edin.), Ltd.	
Lamont, James H., & Co., Ltd.	
Lancashire Dynamo & Crypto, Ltd.	
Lawler, Ayers & Co., Ltd.	
Le Bas Tube Co., Ltd.	
Leeds X.L. Fire Cement Co.	
Lionweld, Ltd.	
Lind, Peter, Ltd.	
M	
Macpherson, Donald, & Co., Ltd.	
Magnetic Valve Co., Ltd.	527
Main, R. & A., Ltd.	
Marco Conveyor & Engineering Co., Ltd.	
Master Gas Cookers, Ltd.	
Mavor & Coulson, Ltd.	
Mechanical Handling	
Meigh Castings, Ltd.	547
Meltham Silica Fire Brick Co., Ltd.	539
Mercol Products, Ltd.	
Messenger & Sons, Ltd.	
Meters, Ltd.	
Metropolitan Leather Co., Ltd.	
Milnes Meters, Ltd.	
Mitcham Smelters, Ltd.	547
Mitchell, H., & Co.	
Moler Products, Ltd.	
Monk, A., & Co., Ltd.	
Morris Commercial Cars, Ltd.	540
N	
National Benzole Co., Ltd.	
National Enamels, Ltd.	
Newton Chambers & Co., Ltd.	
Norwest Construction & Co., Ltd.	
Nu-Swift, Ltd.	S3
O	
Olding, Jack, & Co., Ltd.	535
Orme, Evans & Co., Ltd.	
Oxley Engineering Co., Ltd.	
P	
Parkinson & Cowan (Gas Meters), Ltd.	552
Parkinson Stove Co., Ltd.	
Pass, E., & Co., Ltd.	
Peckett & Sons, Ltd.	

	PAGE
Peebles & Co., Ltd.	
Peel, H., Ltd.	
Pegson, Ltd.	
Perl Controls, Ltd.	551
Plus Gas Co., Ltd.	
Power Gas Corporation, Ltd.	
Power Jacks, Ltd.	
Powers-Samas Accounting Machines (Sales), Ltd.	
Pratt Engineering Co.	
Press, William, & Son, Ltd.	
Pulsometer Engineering Co., Ltd.	
R	
Radiant Heating, Ltd.	
Radiation, Ltd.	568, 569
Rawlplug Co., Ltd.	S6
Reavell & Co., Ltd.	530
Riley, A. J., & Son, Ltd.	
Roberts, R. E., & Sons, Ltd.	
Robinson, J. H., & Co. (Liverpool), Ltd.	
Royles, Ltd.	534
Rozalex, Ltd.	
Russell, R., & Sons, Ltd.	539
S	
Salter, T. E., Ltd.	
Saunders Valve Co., Ltd.	
Scottish Non-Ferrous Tube Industries, Ltd.	
Shannon, Ltd.	
Siebe Gorman & Co., Ltd.	
Sigma Instrument Co., Ltd.	
Simon-Carves, Ltd.	
Simon, Richard, & Sons, Ltd.	
Sisson, W., & Co., Ltd.	532
Slingsby, W., & Co., Ltd.	
Smith Meters, Ltd.	
Smith, Thos., & Sons (Rodley), Ltd.	
Spence, Peter, & Sons, Ltd.	
Spencer Bonecourt, Ltd.	
Sperryn & Co., Ltd.	523
Standard Furnace & Setting Co., Ltd.	
Stanton Ironwork Co., Ltd.	
Staveley Iron & Chemical Co., Ltd.	531
Stein, John G., & Co., Ltd.	
Stelcon (Industrial Floors), Ltd.	
Stephenson Developments (Hudd.) Ltd.	S3
Stewart & Gray, Ltd.	
Stewarts & Lloyds, Ltd.	
Stone, J. B., & Co., Ltd.	
Stoves, Ltd.	525
Strachan & Henshaw, Ltd.	
Stringer Bros.	S4
Sugg, William, & Co., Ltd.	
Summerson, Thos., & Sons, Ltd.	
Sutcliffe Speakman & Co., Ltd.	
Sutherland, A. G., Ltd.	
T	
Taylor, F., & Sons, Ltd.	
Thomas & Bishop, Ltd.	580
Thomas (Richard) & Baldwins, Ltd.	
Thompson, John, Conveyor Co.	
Thorp, Thomas, & Co., Ltd.	
Tully, Sons & Co., Ltd.	
Turners Asbestos Cement Co., Ltd.	
U	
Underpressure Engineering Co., Ltd.	
United Kingdom Construction & Engineering Co., Ltd.	Cover II
V	
Vale, Thomas, & Sons, Ltd.	530
Visco Engineering Co., Ltd.	
Vulcan Stove Co., Ltd.	
W	
W.D. (Sheeters), Ltd.	
Wailes Dove Bitumastic, Ltd.	545
Wakefield, C. C., & Co., Ltd.	577
Wakelin, F. H., Ltd.	S4
Walker, C. & W., Ltd.	
Walker, Crosweller & Co., Ltd.	
Waller, George, & Son, Ltd.	528
Ward, Thos. W., Ltd.	573
Webster, H. R., Ltd.	
Wellington Tube Works, Ltd.	
Wellman Smith Owen Engineering Corpn., Ltd.	
Wessex Industries (Poole), Ltd.	
West's Gas Improvement Co., Ltd.	Cover III
West Hunwick Silica & Firebrick Co., Ltd.	
West's Piling & Construction Co.	Cover IV
Westwood & Wrights, Ltd.	536
Whessoe, Ltd.	
Whitehouse, Wm., & Co., Ltd.	
Whittaker Hall & Co. (1929), Ltd.	
Wilkes, A. H., & Co., Ltd.	
Willey & Co., Ltd.	
Williams, John E., Ltd.	
Williamson Cliff, Ltd.	S1
Wilson, George, Gas Meters, Ltd.	
Winn & Coales, Ltd.	
Woodall-Duckham Vertical Retort & Oven Construction Co. (1920), Ltd.	567
Wood, Hugh, & Co., Ltd.	
Wright, Alexander, & Co., Ltd.	
Y	
Yorkshire Copper Works, Ltd.	

Appointments Vacant	S3, S4
Appointments Wanted	
Contracts Open	
Educational	
Financial	
Miscellaneous	S4
Patents	S4
Plant For Sale & Wanted	S4
Publications	S4
Repairs	



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104th YEAR OF PUBLICATION

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VOL. 272 NO. 4670 DECEMBER 3, 1952

CONTENTS

Page

INSTITUTION OF GAS ENGINEERS

Duke of Edinburgh Accepts Honorary Life Membership 553
Review of Autumn Research Meeting 554
A Memorable Year for Research: Speeches at the Research Luncheon 562

NEWS OF CURRENT EVENTS

Personal 561
Calendar and Directory 561
Diary 563
World Power Statistics 563
Visual Aids for Schools 566
Easiclene Refrigerators 566
Chicken in the Kitchen: Poultry Show at Olympia ... 575
Old World Hotel Modernised by Gas 576
Smith Meters Staff Dinner 579
Dublin Gas Prices 579
Gas Heating Recommended for Middlesbrough Town Hall 579
Trade News 580

FEATURE ARTICLES

Teaching and Research at Leeds: A Survey of the Present Position. By Professor A. L. Roberts ... 564
Summer Hot Water Supply: A National Survey ... 571

IN PARLIAMENT

Shortage of Pipes: Natural Gas: District Heating ... 566

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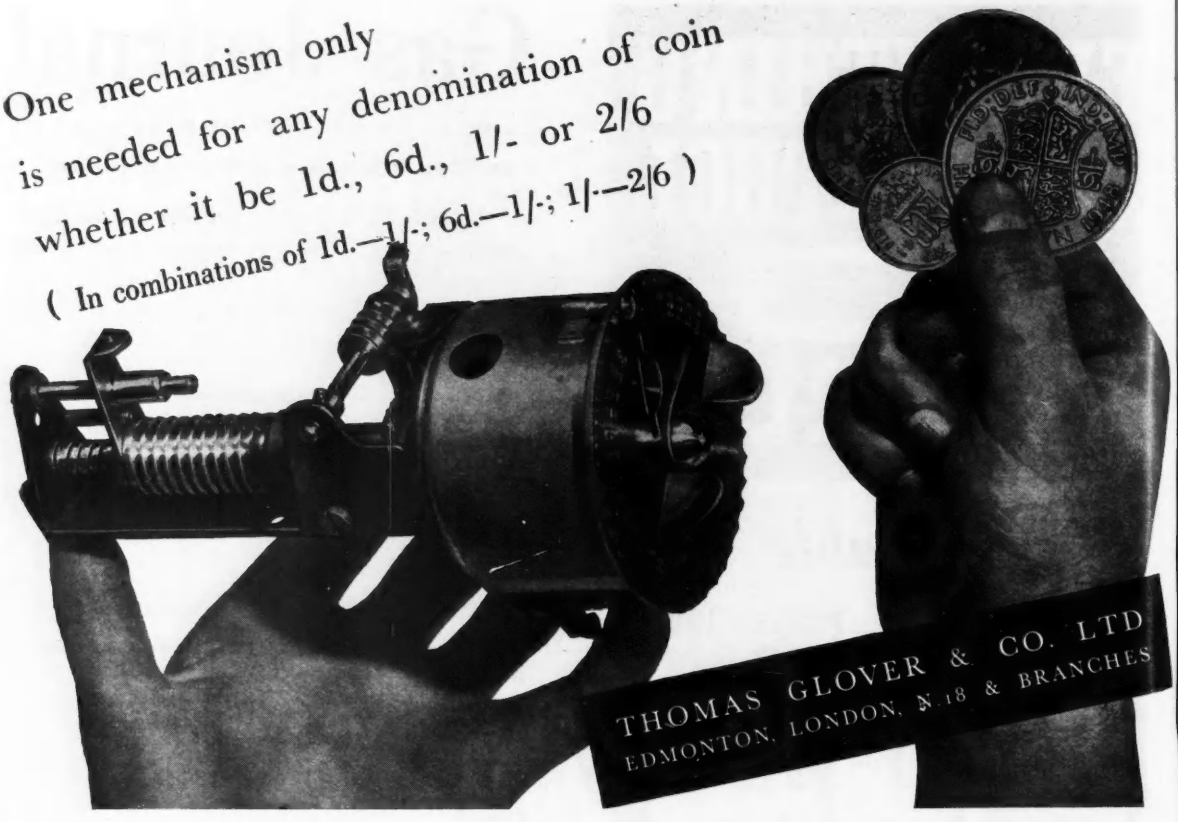

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GAS JOURNAL

VOL. 272. No. 4670 104TH YEAR DECEMBER 3, 1952

Institution Research Meeting

THE tenor of this year's autumn research meeting of the Institution of Gas Engineers, held at Church House, London, on November 25 and 26, under the presidency of Mr. G. E. Currier, O.B.E., did not differ from that of former meetings of the kind, though this year the second day's proceedings provided a platform for presentation and discussion, not as previously of Gas Research Board communications and reports, but for the first time of Gas Council research projects. A significant change, of course, but one of name rather than substance, as affecting the meeting itself. As on former occasions attendance was excellent, and we thought that several of the discussions were marked by more than customary interest and vitality.

His Royal Highness the Duke of Edinburgh, Honorary Life Member, Institution of Gas Engineers.

The meeting started on the morning of Tuesday, November 25, on a most pleasing note, the President announcing that His Royal Highness the Duke of Edinburgh had graciously consented to become an Honorary Life Member of the Institution. This further example of the keen interest taken by His Royal Highness in the greater application of science and research to the development of our great industries and in the suitable training of professional engineers, said Mr. Currier, was particularly appreciated, since the Institution of Gas Engineers, which was founded in 1863, was expressly entrusted by its Royal Charter with the furtherance of these objects.

The President then extended a welcome to visitors from overseas, referring to Mr. C. Pilo, President of the Swedish Gasworks Association, to M. R. H. Touwaide, General Secretary of the International Gas Union and Secretary of the Belgian Gas Association, and to Mr. R. J. S. Thompson, Continental representative of W. C. Holmes and Co., Ltd. Followed the report by the Secretary of the Institution, Dr. W. T. K. Braunholtz, O.B.E., of a cable of good wishes from Colonel H. Zollikofer, General Secretary of the Swiss Gas and Water Association, and of letters conveying good wishes from the French Gas Association and the Gas and Water Association of the Saar.

And then the President extended a very special welcome to a distinguished friend of the Institution—one who had given the Institution long and faithful service. He was speaking of Mr. John Terrace who, some months since, had had to undergo a major operation. Mr. Terrace had made a fine recovery, and there he was with them that morning.

We started the first business of the meeting when Mr. J. H. Dyde presented the report of the Chairmen's Technical Committee, 1951-52. Mr. Dyde explained that the Gas Council had continued its policy of calling upon the Institution for information and advice on technical matters, and among such subjects dealt with had been the revision of the standard conditions of contract, the revision of model building by-laws, the disposal of liquor effluent, and public lighting. The Institution appreciated the opportunity of working for the Gas Council in the interests of the industry as a whole.

Mr. Dyde went on to say that the Codes of Practice Sub-Committee was revising several codes which had

J. H. Dyde, Chairman of the Education Committee.

been in existence for a number of years and needed amendment in the light of experience or to incorporate new developments. The Gasworks Effluents Committee had done a great deal of work behind the scenes in answering queries regarding the composition and treatment of effluents, and the content of agreements with local authorities. The mass of information that it had collected and collated concerning effluent treatment had placed the committee in a position to give advice particularly in regard to the reasonableness of conditions under which effluent might be accepted by local authorities and the costs of treatment at sewage works. The committee welcomed the co-operation and good relations which some area boards were establishing with those responsible for sewage purification. They looked forward, however, to the fundamental work on the mechanisation of biochemical purification being carried out at the Universities of Leeds and Birmingham to provide a scientific basis upon which both capital costs and operating costs of treatment could be assessed. Investigations abroad revealed that other countries were following the lead taken in Britain in cleansing their rivers and waterways of pollution. This was a social obligation which could not be disregarded or neglected.

Continuing, Mr. Dyde remarked that the Gasworks Safety Rules Committee continued its work under its energetic and purposeful Chairman, Mr. E. J. Stewart.

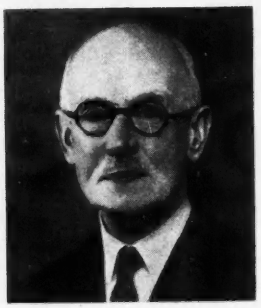
The Foolproof Fallacy

The committee, if he might say so, should adhere to fundamentals in design and operation required to ensure safety, and should not become too rigid or exacting as to detail. For instance, as long as a principle in safe design was established, there invariably remained a number of equally effective ways of carrying it out.

He would make one other comment on safety as affecting the industry as a whole, and it was prompted from accident experience coming within his personal purview and as a result of impressions gained in America. It was this. They were tending to make everything *fool*proof—as if indeed they were dealing with fools; and they were neglecting the human and psychological approach to accident prevention. Hazards existed, and should be appreciated; workmen had responsibilities to themselves and to their team-mates. In America, the trade unions were active in this respect among their members, and foremen had particular responsibilities in regard to the safety of the men under their charge. It was common practice to give bonus additions to wages to gangs or works, whatever the unit selected, within an organisation for the best accident-free record for the month. On the other hand, the regulations governing physical precautions did not appear to be so onerous in the States as they did in Great Britain. In the States was much unguarded machinery which would make Britain's factory inspectors bristle. There was, said Mr. Dyde, a compromise which provided the most desirable answer to this question of safety.

Philip Wedgwood, Eastern Gas Board.

Following the comments of Mr. E. J. Stewart, Chairman of the Safety Rules Committee, the report was open to discussion, and Mr. W. K. Tate, Junior Vice-President of the Institution, among other comments, referred particularly to the recent tendency to try to direct the application of crude liquor on the earth as a fertiliser. In the past 12 months, he said, he had managed to get rid of about 1 mill. gal. of liquor in that way with, in general, satisfaction to the farmers concerned. That satisfaction, however, was not always present, and they found that certain types of liquor, even of the correct strength, even clean, when applied to land did not do its job properly and might even do harm. He therefore asked the Gasworks Effluents Committee to spare a little time and, in conjunction with some of the universities or colleges specialising in agricultural matters, examine crude effluent, clean effluent, and find out what were the limiting factors in a liquor which would ensure satisfaction.

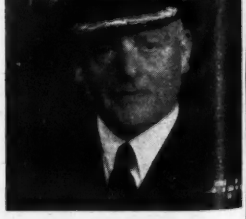


John Terrace, Hon. Secretary of the Institution.

There might, said Mr. Tate, be a future for this type of disposal. It was seasonal, it required a fair amount of plant, it required specialised application from people who knew how to do it and who were used to doing the application of insecticides. There was, however, a future for the use of ammoniacal liquor on the land.

Mr. Philip Wedgwood, Eastern Gas Board, then entered the fray. He talked about effluents disposal and called attention to a *cause celebre*. To wit, the case of Lord Brockett *versus* Luton Corporation, which was in the Courts again in October, 1952, when the injunction was suspended for another year. But the Judge gave certain directions. One of them was 'diligently to investigate means of reducing the amount of nitrates and other chemical fertilisers in the effluent;' another was 'to endeavour to secure compliances with regulations covering the discharge of trade effluent into sewers.'

Those two points, said Mr. Wedgwood, were very important. The Luton case was likely to become the standard to which other cases in the future would be referred, and people would be asked to maintain those standards. He had been familiar with the Luton situation for many years, and he would remark that the effluent from the Luton works was the best effluent he knew, and that more recent sewage works were not producing as good an effluent as was Luton and yet that was not considered to be good enough.



Captain (E.) W. Gregson, R.N.R.

The points he emphasised were those with which they of the gasworks were directly concerned—namely, a reduction of the free and the fixed ammonia salts in their liquor, which meant that in a good many cases there must be concentrated liquor plants if they could not dispose of this liquor to farmers. That, continued Mr. Wedgwood, raised the point about disposal of the concentrated liquor—whether acid would be available for its working up to sulphate or not. But if pressure was to be applied through the recent enactments concerning rivers, then they must move more quickly.

Luton was faced with making plans for the expenditure of about £160,000 within the next 12 months. There were other places in which steps must be taken quickly to improve effluents. He thought the Minister of Health was going to be in rather a difficult situation, because he was the responsible authority in so many of these things and he had to approve the expenditure on plants—and what was held up at the moment ran to tens of millions of pounds.

Dr. E. Johnson, North Eastern Gas Board.

There was, concluded Mr. Wedgwood, one other point that had been put to him seriously by a number of sewerage people during the past few weeks. It was: 'Please can you give proper attention to the effluent from carburetted water gas plants. It is often said that this is weak compared with gas liquor. It is not. If you take it on O.A., it is one-quarter of the strength, but it causes quite a lot of trouble in sewage works, particularly if it contains much oil.' That was a matter which required attention. The oil should be removed, because there was a whole range of hydrocarbons already in that liquor entering the sewage works of a similar nature to some of the end products which were found in sewage works. So it was obvious that those things were likely to go straight through, and they certainly did affect the solids which were found in the final effluent from the works.

Next on the agenda was presentation, again by Mr. Dyde, as Chairman, of the 1951-52 Report of the Gas Education Committee. Mr. Dyde first commented on the results of I.G.E. examinations. It was true, he said, that the results were extremely poor. It was true that they were in a difficult period of change—of transition from one examination system to another. Therein, to his mind, lay the major reason for the quality of the results achieved. The year 1952 completed the Higher Grade examination which had hitherto been the academic qualification for associate membership of the Institution of Gas Engineers. There had, however, in those transitional years, been a build-up of students endeavouring to pass while qualification on the easier level of the old system was still possible.

Dr. J. Burns, North Thames Gas Board.

The number of students entering for the examination shot up from 309 in 1951 to 443 in 1952. There were among the failures a number who had taken the examination on more than one occasion, and those represented a hard core of those who, in spite of any further teaching, were just not able to make the grade. This, in his view, was the main reason for the high percentage of failures, but there were contributory factors.

L. J. Clark, North Thames Gas Board.

There was an opinion, not without some evidence behind it, that the industry in recent years had not been able to recruit, in a highly competitive market, youngsters of the same calibre as hitherto. Then there was the general fall in standard which other professional institutions and associations in both technology and the arts, accountancy and secretarial practice, had experienced in their examinations. It was attributed to the unsettling period of the war years and to some extent to the changed emphasis in the curriculum of general basic education.

Too High an Absorption Rate

What, queried Mr. Dyde, of the future when they passed into the new associate membership examination more completely in 1953 and fully by 1954? In the first place, they would still be up against what had always been their greatest difficulty—geography—the aggregation of sufficient students in many parts of the country to meet the Ministry of Education requirements for classes at technical colleges. This position would be aggravated since fewer students would be coming forward for this higher level of attainment, equivalent in standard to that of the three major engineering institutions. Over 400 students had entered in 1952 under the present qualifying examination. Mr. Dyde submitted that the gas industry could not continuously absorb highly-qualified men at such a rate, and give them the positions of responsibility and salaries to which they would aspire, particularly when allowance was made for the intake from the universities.

It was therefore highly desirable that education officers and others responsible for education and training in the area boards should survey the potential facilities for technological education in their various centres of population in relation to student requirements. It would be much better to have one or two fully-manned and successful courses operating in an area than a number which barely reached minimum requirements and whose continuity was constantly in jeopardy.

Concluding his comments, Mr. Dyde referred to the examination of the 'Principles and Practice of Gas Salesmanship.' The number of candidates, at 80, was double that of 1951, and the standard achieved was considerably better. It was gratifying to find that area

Dr. F. J. Dent, Birmingham Research Station.

J. E. Davis, South Eastern Gas Board.

boards were recognising the course leading to the certificate in gas salesmanship and consumer service as a necessary qualification for their salesmen and representatives. In response to suggestions made at a previous autumn research meeting in discussing the education report, the Sales Training Committee had, in co-operation with the City and Guilds of London Institute, modified the technological section of the Salesman's Course so that a study of distribution technique or the industrial utilisation of gas, both of which were generally the prerogative of engineers with specialised training, was not now required of candidates for the certificate in gas salesmanship and consumer service.

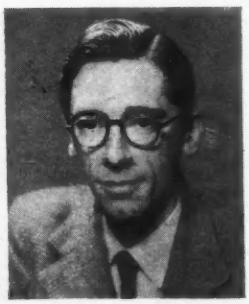
Then came presentation, by Mr. Currier, of awards to those students who had been successful in obtaining some of the highest examination awards that the Institution can offer. Regarding diplomas, the number of candidates in Gas Engineering (Manufacture) was 19; there was one first-class pass and eight second-class passes. In Gas Engineering (Supply) there were 13 candidates, two first-class passes—and an additional one to be awarded when the student reached the age of 25—and four second-class passes.

Presentation of Diplomas

Mr. Currier presented diplomas as follows: Gas Engineering (Manufacture): Jack Parker (Bristol), first class; Edward James Aitken (Dundee), second class; Thomas Robertson Cameron (Galashiels), second class; William Edward Dobson (Birmingham), second class; Kenneth Stewart Donaldson (Scarborough), second class; James Thomson Murray (Glasgow), second class; Samuel Keddie Patterson (Cambridge), second class; Alan Yates (Hereford), second class. (William Joseph Cutler (Springs, South Africa), second class, was unable to be present.)

Gas Engineering (Supply): Russell Oliver Emmony (Cambridge), first class; Douglas Henry Phillip Hammond (Exeter), first class; Roland John Atkin (Nottingham), second class; David Herbert Fred Burchell (Hove), second class; Derek Craven (Leeds), second class; Kenneth Sullivan (Liverpool), second class.

James Archibald Maclay Memorial Prizes: To David Henry Jenkins (Torquay), Gas Engineering (Manufacture); George William Jasper (Brighton), Gas Engineering (Supply).



G. Percival, Birmingham Research Station.

Mr. Currier said how delighted they were to have with them Mr. Holmes Hunt, and he asked Mr. Hunt to present the Charles Hunt Memorial Medals.

Mr. Holmes Hunt presented the Charles Hunt Memorial Medals as follows: Jack Parker (Bristol), Diploma in Gas Engineering (Manufacture); Douglas Henry Phillip Hammond (Exeter), Diploma in Gas Engineering (Supply).

W. J. Gooderham, London Research Station.

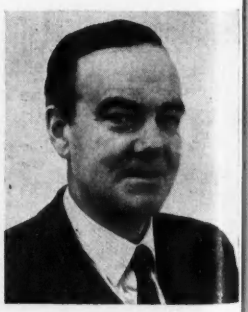
The first paper to be presented was by Captain (E.) W. Gregson, R.N.R., on the application of the gas turbine for recovery of waste heat. This contribution is concerned with the possibilities of adopting the gas turbine for recovery of waste heat in the carbonising industry, based on combined power production and the generation of process steam. Three cycles are described: The open cycle, the closed cycle, and the inverted cycle. Efficiency hinges mainly on two dominant factors of component efficiency (particularly that of the compressor, which represents the 'negative work') and the practical limit of cycle initial temperature. This latter is determined by the availability of the appropriate alloys in reasonable supply. Assuming all factors relevant to overall cycle efficiency to be the same in all cases, then each of the systems should give the same net yield.

In both the open and closed systems, the hot waste gases give up their quota of heat in an air preheater to the turbine motive circuit, which latter is air. The closed cycle machine operates, therefore, on a perfectly clean fluid, and the open cycle can be similarly situated provided adequate filtering of the intake air is effected. The closed cycle arrangement is essentialy a pressurised system, which means that operating on a dense medium reduces the relative sizes of all component parts.

The paper emphasises that, when comparing any gas turbine scheme with orthodox steam practice, it is essential to embark on a case-to-case study, as no two installations are likely to be similar. The author points out that the amount of process steam required is a vital factor in such an investigation.

Application to Continuous Verticals

To effect a reasoned comparison between 'straight' steam and a gas turbine-cum-steam installation, the case of continuous vertical retorts with a throughput of 440 tons per day is considered. The waste gas weight will vary from 75,000 to 95,000 lb. per hour, and with well insulated and gas-tight collecting flues a temperature of 850°C. should be available at the point of recovery application—*i.e.*, either the boiler plant or the main preheater of the gas turbine. This offers an initial air temperature of 650°C. (1,202°F.) for the gas turbine, and is within the present range of alloy availability. Assuming that 5,000 lb. of process steam at 25 lb. per sq. in. are required per hour, then the gas turbine will generate 1,200 kW net. Compared with a modern 'straight' steam scheme, assuming steam at the turbine inlet to be at 230 lb. per sq. in. and 700°F., and bleeding 5,000 lb. per hour at 25 lb. per sq., then the net electricity yield (allowing for all



E. H. M. Badger, London Research Station.

auxiliaries), would be 950 kW. This shows a gain in favour of the gas turbine scheme of some 26.5%. If, said Captain Gregson, we compare with lower-pressure steam for the all-steam scheme (say, 160 lb. per sq. in. and 470°F. at the turbine inlet), then the electricity yield of the gas turbine set works out at 45.4% increase.

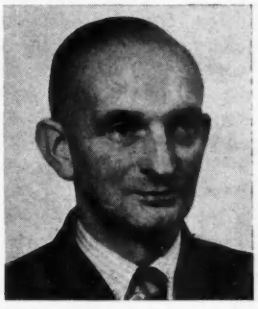
The only gas turbine installation designed to operate in conjunction with carbonising plant at present in the contractual stage is that for the West Midlands Gas Board, at its Foleshill (Coventry) works, and this is discussed in some detail. This particular plant should be operative next year.

Finally, the present state of the art of recovering waste heat is summed up.

Conclusions Reached

Conclusions set out by Captain Gregson are as follows:—

(i) Of the many potential applications of the gas turbine to industry, the recovery of waste heat is extremely attractive, involving no combustion problems, and also operating (when open or closed cycle) on an air circuit as distinct from products of combustion.



F. E. Mills, London Research Station.

(ii) The gas turbine shows optimum overall efficiency when combined with recovery by way of steam at the low temperature end of the cycle, and since both power and process steam are required in any gasworks of size this reacts favourably on the gas turbine.

(iii) Whereas we have many years of operational experience with steam-operated electric generating plants combined with pass-out steam for process work, and can forecast results very accurately, we are still in the embryonic stages regarding the gas turbine, and the tendency of all makers will be to be on the conservative side for guarantees, until further working knowledge is available.

(iv) In spite of this, for generating sets of outputs appropriate to gasworks requirements, the gas turbine-cum-steam cycle already shows distinct advantages over straight steam. This applies especially to base-load plants—*i.e.*, running at constant throughput. With fluctuating carbonising loads, and with steady maximum electricity demand, the position would not be so attractive, as make-up steam from coke breeze-fired boilers is easy to arrange for levelling-up output on an all-steam plant.

(v) The Foleshill plant has been developed on very conservative lines, and, apart from quantitative results, an important function is to demonstrate the reliability of the gas turbine unit for continuous running, and with low maintenance costs.

(vi) The trend for large central carbonising stations should help the development of the gas turbine for the recovery of waste heat, particularly if the layout and siting of the various retort houses are such that all waste gases can be collected at an appropriate central point for one machine. This is not as difficult as it might have appeared some years ago, owing to the advances that have been made in the insulation and more effective gas-tightness of flue systems. Such an arrangement represents optimum recovery with minimum first cost, and means that every new works of size must have surplus electricity available for export to the grid. It must be remembered that straight steam schemes can also benefit by these latter factors, but on present investigations it looks as if the gas turbine/steam combination should lead the field, particularly owing to the comparatively small generating units involved even in the largest gasworks, size being determined by the available waste heat.

Dr. L. A. Moignard, Birmingham Research Station.

(vii) Fair tariffs should be agreed by the British Electricity Authority for intake of the surplus electricity made available, based on coal-saving equivalent at the grid stations.

Application of Butane

Discussion on the paper brought the first session of the meeting to a close. In the interval between morning and afternoon session the Autumn Research Luncheon was held at the Savoy Hotel. Our report of the speeches will be found on p. 562.

Two papers were presented and discussed at the afternoon session on November 25, the first being by Dr. E. Johnson, of the North Eastern Gas Board, on the topical subject of the manufacture of butane-enriched blue water gas on small undertakings. The author explained that there are a number of small works in the area of the Board where the plant is in poor condition and the cost of production high. Wherever possible these works are being linked with larger undertakings in order that the uneconomical units may be closed down. There are, however, several very small isolated works in the area where the cost of production is very high, but which cannot be economically linked to other works, due to the distances involved. Consideration was, therefore, given, in 1949, to the possibilities of substituting other processes of gas manufacture, for the installation of coal carbonising plant, usually horizontal retorts, on these very small, isolated works.

Dr. A. L. Roberts, Livesey Professor, Leeds University.

It was realised that the alternative method of production must have plant that (i) is simple and is capable of being operated by one

man of average intelligence; (ii) is low in capital cost; (iii) requires little maintenance; (iv) under the same conditions, produces a cheaper gas than coal gas; (v) produces a gas suitable for distribution in an existing distribution system, and (vi) produces a gas suitable for utilisation in existing appliances with little or no modifications.

With these conditions in mind many methods were considered, among them the use of liquefied petroleum gases.

As the author points out, hitherto the supply has been rather limited in this country, but, with the policy of refining crude petroleum at home, quantities of liquefied petroleum gases will become more readily available. Discussions with some of the leading oil companies revealed that they will be able to utilise most of the propane for their own purposes, but butane will be available.

While a study of the various plants used for mixing petroleum gases and air indicated that most of the conditions set out could be satisfied, it was considered that there were certain disadvantages of this gas supply, such as (i) high specific gravity, with its attendant effects upon distribution and utilisation; (ii) radically different combustion characteristics that would require major modifications to appliances; and (iii) presence of oxygen in the distribution system, giving rise to corrosion with high maintenance costs.

Cold Enrichment of Blue Gas

Following consideration of the use of blue water gas, blue water gas enriched with aviation spirit or with liquid petroleum gases, the G.E.I.M. oil gas plant, and small complete gasification plant, Dr. Johnson explained that the decision was taken to investigate the cold enrichment of blue gas with butane. An order was placed with Humphreys and Glasgow, Ltd., for a small standard blue water gas plant and the necessary butane mixing apparatus. In the first place, it was decided to install the plant not on a very small works, but on a larger works where the gas supply would not be dependent upon the new plant, where workshop and laboratory facilities were available, and where there was adequate supervision. For these reasons, the Spenborough undertaking of the North Eastern Gas Board was chosen, where, in addition to the advantages stated, the extra gas was helpful in meeting peak demands. The butane for enrichment was obtained from the Stanlow refinery of the Shell Refining and Marketing Co.

As a result of trial several conclusions were drawn, among them the following. In the first place, the plant is simple and is capable of being operated by one man of average intelligence, and does not necessarily demand his full attention. While on the smaller of the works under consideration capital cost is a major item in the total cost, the capital cost of the installation is appreciably lower than that of horizontal retorts.

No details can yet be given of the maintenance costs associated with the plant, but, from the year's operation and previous experience with water gas plants, maintenance costs are not expected to be appreciable.

Dr. Johnson added that the operating costs for the manufacture of butane/water gas are lower than the present cost of coal gas on works of comparable size in the North Eastern Gas Board's area, and since the specific gravity of the gas produced is very similar to that of coal gas, no difficulty should be encountered in its distribution.

The gas mixture has been shown to be very similar to coal gas in its combustion characteristics, and it has been found that little modification is required for the gas to be burnt satisfactorily on existing appliances.

The other paper at the afternoon session on November 25 was a joint one by Dr. J. Burns and Mr. L. J. Clark, of the North Thames Gas Board, on the effect of load variation on costs—a penetrative analysis of this highly important problem facing every area board. As the authors point out, the gas industry is still dependent on three types of gas producing plant—coal gas, carburetted water gas, and peak-load gas. Calculations have been made by the authors for the cost of producing gas in new coke ovens, intermittent vertical chambers, and continuous vertical retorts in plant units of 7.5 mill. cu. ft. a day output with coal at present-day prices supplied into North Thames riverside stations, and accepting the latest prices for labour, coke, tar, etc. The average cost of coal gas under these conditions, including all operating and associated overhead charges, but excluding those of capital, is shown to be 9.50d. a therm. This figure compares with the average of 10.91d. a therm for all existing coal gas plant in the Board's area at the same price level.

From experience, the average load factor of carbonising plants in the North Thames area, including time out for resetting and repairs, is 83%, and on this basis the capital charges for new plant would average 2.48d. a therm, making a total cost of production of 11.98d. a therm. The capital charges carried by the present coal gas plants are, of course, less than half those applying to new plant, with the net result that gas can be produced in new plant at a price approximately equivalent to the average of the Board's existing plant, and cheaper than in many of the smaller units.

The Problem of Peak-load Gas

In the case of new carburetted water gas plants, improvements in efficiency and labour requirements offset to a large degree the impact of present-day high capital costs. It is estimated that gas could be produced in new plants with 6 mill. cu. ft. a day generators at 10.96d. a therm at present operational costs, but excluding capital charges. This compares with 12.79d. a therm as the average production cost from the Board's existing plants.

From the nature of the annual gas load curve, it is evident that a proportion of the carburetted water gas plants is required to operate at high load factor to meet the sustained seasonal load and provide diluent for coal gas. In the North Thames Gas Board's experience, the highest load factor that can be obtained from carburetted water gas plants, after allowing for maintenance and servicing, is about 90%, and under these conditions the capital charges for new plants amount to 1.23d. a therm, making a total of 12.19d. a therm. Thus, gas from the Board's new plants should be cheaper than from many of the existing units when operating at load factors higher than approximately 40%.

Calculations show that the cost of producing peak-load oil gas in new plants at today's operational prices will be 14.29d. a therm, excluding capital charges, or 16.19d. a therm including capital and calculated on the maximum number of days that it will be economic to run the plant —*i.e.*, 77 days per annum. This cost is higher than that of producing gas in the Board's existing peak-load plants, because no major technical developments have taken place in the short period that these plants have been operating.

It is obviously still correct, the authors say, at the present

level of prices to install coal gas plant to meet the base load, if only to supply coke for the carburetted water gas process and to preserve some independence of imported oil. Increasing coal prices will, however, inevitably tend to sway the delicate balance in favour of carburetted water gas, and this may have a far reaching and upsetting effect on the whole of the gas industry's operating economy.

The question is discussed of the determination of the amount of holder capacity required in an interlinked system. Two factors have to be taken into consideration. First, the practical requirement of providing reserve capacity to meet sudden load variations; secondly, economic considerations associated with the relative capital charges on holders against the overall operating and capital charges on production plant. A gasholder of 1 mill. cu. ft. costs about £100,000. Allowing 5% for interest, depreciation, and maintenance, the annual charge would be £5,000. If the whole or part of the holder capacity were used merely as a reserve for peak winter consumption, that capacity would, on the average, be used only once a year, and possibly two or three times in an abnormal year. The cost of gas stored for this purpose would, therefore, be extremely high at about £1 a therm. If the capacity were used solely for taking up the week-end surplus of gas, the cost per therm stored would still be high at 4.6d. a therm, but if used for daily variations the cost would be only 0.6d. a therm stored.

The most important factor affecting storage capacity is that which necessitates a reserve to accommodate the daily variation in stock resulting from the difference between the steady rate of gas production and the varying rate of consumption. With the North Thames type of load, the amount of gas to be supplied from stock represents 22% of the daily demand. Storage capacity is also necessary for other purposes; and the authors put forward a figure for desirable total capacity of 47% of the maximum day's demand.

Influence of Weather Conditions

When the question of the influence of the weather on gas demand. What, it is asked, is the lowest temperature for which plant provision should be made? With provision down to 21°F., on the one hand, there will be plant to meet all requirements, but, coupled with this, there is the probability of plant standing idle for many years without ever being used, incurring maintenance and standby labour costs and maximum production costs per therm. The other extreme may be placed at 35°F., where there will be sufficient plant to meet full requirements on occasional very mild winters only, with the certainty of failure to meet full requirements on all other years. There is, however, a minimum of plant standing idle at all times, and production costs for peak-load gas will be at a minimum.

There is to this problem probably no single answer applicable to the whole country, but it is suggested that each individual area gas board might find an answer suitable for its own particular set of conditions.

Under conditions obtaining in the North Thames Gas Board area the cost of producing 1 therm of peak-load gas may be as much as 13 to 14 times as high as the cost of producing 1 therm of base-load gas. Base-load gas still produces the cheapest therm and still constitutes the most desirable load. Such peak-load gas is sold at a price very much below its cost of production. On the other hand, the amount of peak-load gas produced is very small compared with base-load and sustained seasonal-load gas, and the effect of the high production and distribution costs is masked when spread over all the gas produced. Nevertheless, the effect of peak-load gas production and distribution is to raise the overall cost of supply, and there is obviously a need for an equitable balance between base load, seasonal load, and peak load. It would be very unfortunate for the industry if the production of peak-load gas were to prejudice the real value and the competitive possibilities of gas in the base-load market.

The method of analysing production costs set out in the paper by Dr. Burns and Mr. Clark will be of value in determining appropriate tariffs for the sale of gas under base-load, seasonal-load, and peak-load conditions.

Gas Council Research

The morning session of November 26—the day was devoted to consideration of Gas Council research—started by the presentation by Dr. F. J. Dent, Director of the Birmingham Research Station, of a paper on the Council's gasification programme at that station. The programme is directed specifically to steps to ease, through complete gasification, demands for coals normally used for carbonising. Summarising the situation and giving an idea of how thoughts are shaping, he remarked that the early establishment of complete gasification in full-scale operation would give the best possible impetus to further development and that in some localities circumstances are favourable for the immediate installation of a proved process.

Dr. Dent went on to say that, of existing processes, those based on the water gas cycle warrant full examination, but, for large installations, Lurgi gasification under pressure with oxygen appears outstanding because of its unique combination of several features. First among these features may be mentioned that fuel down to ⅛ in. size can be gasified while there is an outlet for the fines for steam raising. The fuel can be of high ash content (*e.g.*, up to 30%). Then the gas produced can have combustion characteristics similar to coal gas, and, of importance for both industrial and domestic use, it can be completely freed from sulphur compounds. Further, the gas has a calorific value of more than 400 B.Th.U. per cu. ft., and, on account of its purity, further enrichment is readily obtained by methane synthesis. Gasification is, therefore, independent of the use of oil. Again on account of its purity, the gas, when not required for distribution, can be used for the synthesis of liquid products in a way that adds to flexibility. Another consideration is that the gas is made available at a pressure of 20 atm. for distribution from centralised works.

The Lurgi process, commented Dr. Dent, has now been adapted to use weakly caking coals such as are found in this country. Its immediate introduction can be contemplated and would allow further development under British conditions. Advances seem possible towards improved thermal efficiency and the direct production of gas of higher calorific value.

Turning to another aspect of the programme, Dr. Dent referred to processes using powdered coal. These processes are still in the experimental stage, but they are of interest, firstly, for the utilisation of fines, the production of which may be increased by more mechanisation of mining methods and, secondly, as offering the prospect of a higher performance which would justify the intentional crushing of coal. The higher performance can already be realised in the direction of calorific value but the attainment of more efficient gasification in oxygen and steam calls for further investigation.

In gasification processes, Dr. Dent continued, oxygen provides a convenient and efficient method of liberating

heat under pressure and the advantages of pressure operation are obtained by its use. Its limitation to large installations should not prove a serious handicap and, in large installations, it is not unduly expensive. Proposals to avoid the use of oxygen demand consideration, however, since some are also designed to assist the purification of the gas.

Pressure gasification, particularly of powdered coal, can be operated to give a high yield of tar oils and these can be supplemented by synthesised oils. Such products will be of value for the chemical industry, but they also have possibilities for peak-load gas production in place of petroleum oils. Some of the gasification processes proposed for powdered coal can be applied to such oils, and their investigation in that connection, Dr. Dent maintains, would simplify development.

Thermal Efficiency

Dr. Dent's paper, which was not down for discussion, was followed by a report by Mr. J. E. Davis, of the South Eastern Gas Board, on thermal efficiency in gas production and utilisation. He sets out the two methods of computing the thermal efficiency of gas production. The first is that in which the thermal losses in coal processing are debited against all the combustible products in proportion to their thermal value. This gives a figure—which is most correctly termed the 'Percentage Thermal Recovery'—of the order of 80%. The second method regards the operations of the gasworks as having been conducted primarily with the object of producing gas, and debits all the thermal losses to the gas, regarding the other combustible products as having a fuel value therm-for-therm equal to the coal from which they were made.

It is not considered that either of these two methods has an exclusive claim to being 'correct' or 'scientific,' and the propriety of one or the other method depends upon the use to be made of the figure when obtained. Most frequently it is required in order to support the argument that the overall operations of the gas industry, in which raw coal is subjected to processing, result in a substantial fuel saving. Here the efficiency of gas production is one stage in the argument, and whether it or its alternative—the 'Percentage Thermal Recovery'—is to be employed, must depend upon the method of computation in the later stages. Due allowance must be made for the fact that only a proportion of the coke produced is used at a higher efficiency than is possible with coal.

The principles recommended in this document were adopted by the Gas Council in the evidence given to the Ridley Committee. Initially all the thermal losses of coal processing are first debited to the gas, but a credit is then taken for the enhanced thermal efficiency of coke used in domestic appliances to the extent that coke is so used.

The snag about either method is the extent to which it can be assumed that the heat content of the tar and breeze should be credited to the account. In practice not all the heat is recovered from the tar; neither is it from the breeze.

Then came a report, presented by Mr. G. Percival, of the Birmingham Research Station, on the influence of preheating the air and steam supplies on the performance of a blue water gas plant. This report describes tests carried out on a small blue water gas plant, the air and steam supplies to which could be preheated by heat exchange with the blow and up-run gases. The plant was specially constructed for the tests. Newton Chambers and Co., Ltd., were responsible for the preheater. The whole of the rest of the plant was designed and built by Humphreys and Glasgow, Ltd.

Under the conditions of test, preheating led to increases in both the yield of gas from the coke and the output of gas per day, without clinker formation becoming more serious. With a horizontal retort coke, the yield increased from 68.6 to 74.2 therms per 100 therms of coke, and, with a continuous vertical retort coke, from 66.1 to 72.3 therms. The accompanying increases in output were from 46.1 to 52.7, and from 44.2 to 50.0 therms per hour respectively. These results were obtained with a preheater that was difficult to purge, and heat balances indicate that, if losses at purging had been normal, the increases would have been approximately 10% in the thermal yield of blue water gas from the coke, and 20% in the output per day. By choosing other gas-making cycles, even greater yields could have been obtained from the coke if the gain in output had been sacrificed, and *vice versa.*

When the preheat temperature was increased, a smaller proportion of steam was required on the back run in order to maintain the clinker at the proper level until, with preheat temperatures of 600°C. and above, the back run could be dispensed with entirely. This simplified the operating cycle and, on a carburetted plant, would improve the conditions for oil cracking. It resulted, however, in the gases carrying away more heat from the top of the generator, and in consequence most of the gain in gas yield and output were obtained at intermediate preheat temperatures around 400°C., with the back run retained.

When only the steam supply was preheated, there was little improvement in performance, but this result was from an isolated test and requires confirmation.

Further Research Reports

The morning's business was brought to a close by presentation and discussion of a report by Messrs. W. J. Gooderham and F. E. Mills, of the London Research Station of the Gas Council, on the effects of traces of iron carbonyl in town gas. Iron carbonyl is one of the undesirable minor constituents of gas, occasionally present in quantities large enough to be troublesome. One of these occasions occurred recently in a newly laid gas main in Essex and provided an opportunity to study its effect on flames and appliances in greater detail than has been recorded hitherto. It was found that many of the effects were the consequence of the catalytic effect of the iron, deposited by the thermal decomposition of the carbonyl, on some substances present in the gas. This observation is consistent with the effects of the contaminated gas on appliances supplied from the Essex main. The effects of the gas on flames, both aerated and non-aerated, are striking.

Ultimately, the main was treated with sulphur dioxide, which is known to react readily with active iron, and no further complaints have been forthcoming.

During the investigation, new analytical methods were tried.

Three reports were presented and discussed at the closing session on the afternoon of November 26. The first was by Mr. E. H. M. Badger, of the London Research Station, on sampling and quality control. In this the author describes the use of statistical methods in devising methods of sampling two materials of interest to the gas industry—silica refractories and coal. Methods of assess-

ing the significance of differences between the results obtained by different laboratories are discussed.

The other communications were the 43rd report of the Joint Refractories Committee of the Gas Council and the British Ceramic Research Association and a report by Dr. L. A. Moignard, of the Birmingham Research Station, on the performance of oxide purifiers. The object of the work described in this report was to establish methods of obtaining a good performance, in respect of hardening, back pressure, and gas throughput, in conventional oxide purifiers. The main features of the results of full scale work are that hardening has been minimised to the extent that a 45 in. layer of oxide can be discharged from a 40 × 30 ft. purifier by 12 men in little more than a working day; that the daily throughput of gas containing more than 700 grains of hydrogen sulphide per 100 cu.ft. has reached 4.35 mill. cu.ft. for a winter quarter (R ratio = 40), with shorter periods at over 5 mill. cu.ft. per day; and that back pressure has ceased to be an embarrassment.

These results, together with those of the earlier reports and other indications, have enabled recommendations for purifier operation to be formulated.

VOTE OF THANKS

The proceedings came to a close with an omnibus vote of thanks proposed by Mr. W. R. Branson, of the East Midlands Gas Board, who said how gratifying it was that the demise of the Gas Research Board had led to no reduction in the number of papers presented on research projects. He paid special tribute to Dr. Braunholtz and his staff for their customary efficient organisation of the meeting. The vote was seconded by Mr. B. C. Morton, Robert Dempster & Sons, Ltd., who testified to the great importance which contractors attached to Institution research meetings.

Personal

Mr. H. Staniforth has retired from the Arrow Press, Ltd., and is now living at 19, Eastbury Road, Oxhey, Herts.

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Miss M. B. de Peare retired on December 1 having completed 50 years as a member of the staff of Falk, Stadelmann & Co., Ltd. Miss de Peare joined the firm in 1902, and worked her way up until she reached the position of manageress of the secretarial and typing department. The Directors are presenting her with a wireless set and a cheque.

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Mr. F. W. Robins, author of *The Story of the Lamp* and *The Story of Water Supply*, is retiring from active work after 52 years of association with the gas industry, five in it and 47 in intimate contact with it. He was formerly with the British Mannesmann Tube Co., Ltd., and Stewarts and Lloyds, Ltd., and in sending greetings to old friends he writes: 'Though my heart has not been solely in business life I have found a great deal of happiness in it through the pleasant relationships I have had with gas engineers and their staffs.'

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Mr. Owen R. Guard, Chairman of the Southern Gas Board has resigned his position as from the end of this month. He will have completed four years of service as Chairman, and is resigning in order to be able to devote himself once again to private business interests. He will, however, continue his association with the Board as a part-time member. Mr. Guard was formerly Joint Managing Director of the Associated Coal and Wharf Co., Ltd., Director of United Drapery Stores, Ltd., Vice-Chairman of Arding & Hobbs, Ltd., Chairman of Fraser & White, Ltd., and Director of J. R. Wood & Co., Ltd. His successor as Chairman of the Southern Board as from January 1 will be **Mr. A. R. McBain,** C.B., O.B.E., at present a part-time member of the Board and a part-time member of the Iron and Steel Corporation.

CALENDAR AND DIRECTORY

NEARLY a month earlier than for several years past, the first copies of the new edition of the *Gas Journal Calendar and Directory* have been dispatched, and all *Journal* subscribers and *Calendar* advertisers who are on the list for complimentary copies may expect delivery between now and the end of the month. Additional copies at the published price of 25s., including postage, will be available shortly after the general distribution. The punctual production of the 1953 *Calendar and Directory* is the result of team work at its best and in its widest sense. Gas officials at headquarters, in the areas, and in fact at all levels, co-operated by completing and returning the questionnaires, on which we rely for the accuracy of the *Directory* information, in good time; advertisers and their agents were equally helpful in providing their layouts and buyers' guide information. In consequence of a change of printers the whole of the literary contents had not only to be revised but re-set in a slightly different type, and we gratefully acknowledge the help we received from the printers in this direction. In some quarters the progress of integration, the closing down of smaller works, and the grouping of undertakings in divisions, districts, and groups have accelerated a tendency—which made its appearance in the first year of nationalisation—to restrict the amount of information concerning individual outputs and the names of the local officials, but we have endeavoured as far as possible to maintain the usefulness of the *Directory* by giving as much information as we have been able to gather from the recognised sources.

The latest available statistical information gives outputs, sales, and other operational results for 1950-51, and the personnel section is—or was on the day of going to press—as accurate as we could make it. But change is the only constant feature of such a work of reference, and a little later we give particulars of alterations that have been notified since the pages were passed for press. The advertisers' announcements and index, and the usual buyers' guide, again reflect the enterprise of gasworks contractors and makers of equipment and appliances in the face of limitations imposed by shortages of materials and the ban on promotional publicity. The following changes (together with the appropriate adjustments in the personnel section (pp. 141-156)) should be noted in the new edition to bring the information up to date. Throughout the coming year we shall follow our usual practice of publishing revisions in the first issue of the *Journal* in each month.

Page 31.—ILKESTON: E. M. Frost, *Dist. M.*, vice J. A. Derbyshire.

„ 34.—BOURNE: Delete J. Rose, *M.*, retired.

„ 86.—TUNBRIDGE WELLS: Delete G. J. B. Cox, *E.*, removed to Edinburgh.

„ 105.—WALES GAS BOARD: Add T. S. Ricketts, M.INST.GAS E., *Grid Manager* (South Wales).

„ 112.—HOLYWELL AND FLINT: T/N Holywell 465/6.

„ 115.—WEST MIDLANDS GAS BOARD: Delete T. F. E. Rhead, *Scientific Adviser*, retired; add E. T. Pickering, *Area Chief Chemist.*

„ 119.—NUNEATON: G. Helps, *E. & M.*, retiring December 31.

„ 124.—EDINBURGH DIVISION: G. J. B. Cox, B.E.M., B.SC., *Divisional Engineer.*

„ 131.—LANARKSHIRE GROUP: Delete F. R. Mitchell, *Group Manager*, deceased.

„ 187.—INSTITUTION OF CHEMICAL ENGINEERS: Professor M. B. Donald, *Hon. Secretary*, vice L. O. Newton, deceased.

„ A16, A220, A231.—CHARLES WINN & CO., LTD.: T/N changed to Midland 7151 (9 lines).

A Memorable Year for Research

MR. L. W. JOYNSON-HICKS, Parliamentary Secretary to the Ministry of Fuel and Power, was the principal guest at the 18th autumn research luncheon at the Savoy Hotel on November 25. In responding to the toast of the guests he assured the President and all engaged in gas research that the Ministry was interested in the developments which they had under review and was anxious to lend every support and help that it could to press on with the work of research which it regarded as of fundamental importance and which was also of vital interest to the needs of the community throughout the country.

The PRESIDENT, Mr. G. E. Currier, proposed the toast of the guests, among whom he named the ladies, led by Dame Vera Laughton Mathews, fresh from her triumph at the International Kitchen; M. Pilo, President of the Swedish Gasworks Association; M. Touwaide, General Secretary of the International Gas Union; and Mr. R. J. S. Thompson, of Paris; Colonel Harold Smith, Chairman of the Gas Council; Mr. Henry Jones, Deputy Chairman; and chairmen and deputy chairmen of several area boards; Sir Ben Lockspeiser, Secretary of the Department of Scientific and Industrial Research; Dr. D. T. A. Townend, C.B.E., Director of Research, British Coal Utilisation Research Association; Dr. E. C. Bullard, Director of the National Physical Laboratory; Dr. D. D. Pratt, Director of the Chemical Research Laboratory; Dr. A. Parker, Director of the Fuel Research Station; and several other research directors; Major-General C. Lloyd, C.B., C.B.E., Director of the Department of Technology, City and Guilds of London Institute; Professor O. A. Saunders, Professor of Mechanical Engineering, Imperial College of Science and Technology; Professor M. B. Donald, Ramsay Memorial Professor of Chemical Engineering, University of London; Professor D. G. Christopherson, O.B.E., Professor of Mechanical Engineering, University of Leeds; and their own Livesey Professor, Professor A. L. Roberts; representatives of kindred organisations; and the Press, both technical and non-technical. The technical Press has always served the Institution well, and they in turn tried to give the Press all the help they could.

Newcomers from the Ministry

He referred especially to the retirement of Sir Donald Fergusson and the presence of his successor, Sir John Maud. Another newcomer was Mr. Keith Stock, the newly-appointed Under-Secretary in charge of the Gas Division of the Ministry of Fuel and Power. An old stalwart and not a newcomer was Mr. J. S. Smith, of the Gas Division of the Ministry of Fuel and Power; it would be difficult to assess the value of the work which Mr. J. S. Smith had done for the gas industry during the war and in the post-war years.

Mr. L. W. JOYNSON-HICKS, Parliamentary Secretary to the Ministry of Fuel and Power, responding, said he was particularly glad to see the inter-communication and the linkage in research both between the Gas Council's Research Committee and also the research activities of the plant manufacturers. It would be a bad thing if anybody's research organisation got into a separate compartment. All research bodies approached subjects from different angles, and all research bodies learnt something which was going to be helpful to other bodies working on different problems but which, nevertheless, would have their impact upon one another. He was glad that the plant manufacturers had their connection with the Gas Council's Research Committee and that they, in their turn, were connected up and exchanging information so far as it was relevant and useful with other research bodies active throughout the country.

The President

G. E. CURRIER, O.B.E.

This had been a memorable year for the organisation of research throughout the industry. It had seen completed the transfer of the work and the assets of the Research Board to the Gas Council's Research Committee. That was an important step in which many people and many organisations had played their part, and it was particularly a step which was the result of many years' thought and development. It had not come about suddenly. It had not come just as somebody's bright idea.

To effect such a change had not been without heart-burnings, and it would not have been a success if it had not had its critics and so forth, but the great thing to his mind was that the decision had now been taken, the transfer had been completed and the job had been done, and therefore there must be no holding back at all and there must be no regrets throughout any part of the industry.

He could see an immense vista open to development throughout the gas industry, and particularly in regard to research. There was tremendous scope for the widest possible advances. He was glad they were concentrating on research into the use of methane, which was important not only from the point of view of the gas industry but from the point of view of the coal industry as well, because the more quickly they could achieve results and the more valuable they could make the methane itself, the greater would be the incentive to the extraction of methane from the mines.

Appliance Efficiency

Speaking of appliances, he noticed that in the last 30 years the efficiency of gas cookers had increased by 50%. He wondered whether that was really enough; he did not know, but he confessed he was a little surprised that it had not been more. He had been surprised that, basically, the design of the gas cooker today was much the same as it was in Queen Victoria's day. He was not alive in Queen Victoria's days, or he might not then have minded so much always having to go down on his hands and knees when he wanted to open the oven. Nowadays, of course, it did not matter to the ladies—but 'we male cooks are no longer lithe and lissom, as we used to be—and why should we have to go down on our hands and knees whenever we want to look in the oven?'.

One would assume that if one wanted to put something into the place where it was going to be kept hot one would put it on top of a flame. But they did not; they put it under a flame in the gas cooker; all their flames were put above what was being heated.

The Institution

Colonel HAROLD C. SMITH, C.B.E., Chairman of the Gas Council, in proposing the toast of the Institution, referred to the Parliamentary Secretary's criticism of gas cookers and his suggestion that the basic design had not altered since the reign of Queen Victoria. What had happened with the new gas cooker was that it had had a lot of glamour attached to it. Without conducting any serious amount of research, one could perhaps say that the basic design of the young woman today had not really changed from that of the young woman of Queen Victoria's days. It was only that she had had little bits of glamour stuck on her. That was what had been happening to the gas cooker. They had gone a little further than that, because the present-day cooker used three therms to do what Queen Victoria's cooker did with five.

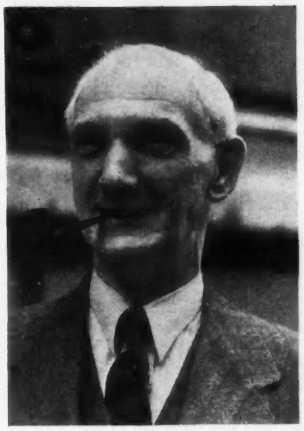
The Institution, continued Colonel Smith, had an important job to do, and it was working in close liaison with the Gas Council, giving the Gas Council a vast amount of technical help. It was enabling the Gas Council to do its job without setting up its own technical organisation, and, at the same time, it was assisting in training and examining

young gas engineers. It was doing that as an entirely independent body.

They must take every possible step to improve and increase the efficiency of carbonising processes and to improve methods of distribution, and—he agreed entirely with the Parliamentary Secretary—to improve the design of appliances. In these days of rising costs, they could not afford not to extract every possible therm from every ton of coal carbonised.

They were now concentrating on complete gasification, and he would be disappointed if in the reasonably near future they did not see a complete gasification plant working in this country. It might not be a British plant, but he had the authority of the Chairman of the West Midlands Gas Board, Mr. Diamond, to say that as a result of a visit which he recently paid to Germany there was a very good chance that a Lurgi plant would be going up in the West Midlands area in the comparatively near future.

Mr. Henry Jones had also recently been to Germany and had seen what was going on there. The strides made by the Germans during the war with their complete gasification and their Fisher-Tropsch synthesis had been tremendous, and obviously the possibility had to be considered of the Fisher-Tropsch plant or process being used for the synthesis of methane, first of all for the enrichment of the town gas made on complete gasification plant, and, also, possibly, for synthesis of other products which might be made during the time when the gasification plant would not normally be required to work at full load to supply gas.



The Senior Vice-President
J. T. Haynes

Mr. J. T. Haynes, M.I.C.E., Senior Vice-President of the Institution, replying to the toast, said not only were they proud of the Institution; they were also proud of the gas industry. It had survived nearly 150 years of about the most gruelling time which any Institution or industry had had. Many of its difficulties had been accidental; some of them had been made with malice aforethought. In the early days it was lampooned by those who expressed the natural disinclination of the British character for change and enterprise. Over many years it was subjected to restrictive legislation, which, as the years went by, became more and more out of date. It had to survive the keen competition of electricity. It had to survive the jeremiahs from outside and also, unfortunately, some of the jeremiahs inside its ranks who stated time and again that it was a dying industry.

Diary

Dec. 5.—London Juniors: Reception and Dance. Caxton Hall, Westminster, S.W.1, 6.30 p.m.

Dec. 6.—Yorkshire Juniors: 'Industrial Gas,' R. W. Deans; Gas Showrooms, Leeds Road, Bradford, 2.30 p.m.

Dec. 6.—Wales Juniors: 'The Pusuit of Efficiency on Gas-making Plant,' G. G. Barker (Cardiff); Gas Showrooms, St. John's Square, Cardiff, 2.30 p.m.

Dec. 6.—Scottish Juniors: Joint Meeting of Eastern and Western Districts. 'Some Problems of Large Scale Organisations.' Dr. J. G. Davidson, Chief Financial Officer, Scottish Gas Board, at Heriot Watt College, Edinburgh, 3 p.m.

Dec. 8-12.—Smithfield Show, Earls Court. Gas Council exhibit.

Dec. 10.—Eastern Juniors: Visit to works of Bratt Colbran & Co., Ltd., Lancelot Road, Wembley, 2 p.m.

Dec. 10.—London and Counties Coke Sales Circle: Christmas Party, Holborn Restaurant, 2.30 p.m.

Dec. 10.—Institute of Petroleum: Papers on production, distribution, and applications of liquefied petroleum gases; 26, Portland Place, W.1., 5.30 p.m.

Dec. 12.— Scottish (Western) Juniors: Film night; 'Construction of a new gasholder at Alloa Gasworks,' D. C. Dow, Alloa.

Dec. 12.—London Juniors: Address by J. S. Barnes, LL.B., Solicitor, North Thames Gas Board, 178, Edgware Road. 6.30 p.m.

Dec. 13.—Manchester Juniors: President's Day, Visit to Salford undertaking.

Dec. 13.—Western Juniors: Visit to Torquay works; 'Mains Extensions in relation to Housing Development,' R. Pratt, Taunton.

Dec. 16.—London Juniors: Alternative evening visits, 8.30 p.m. Newspaper Offices:—*The Times,* and *Daily Graphic.*

Dec. 16.—Midland Juniors: 'Use of Gas in the Manufacture of Pottery,' K. Davis, Stoke-on-Trent.

Dec. 16.—London and Southern Section, I.G.E.: 'The Supply, Transport and Distribution of Coal to the South Eastern Gas Board,' A. G. Gostelow: 17, Grosvenor Crescent, S.W.1. 2.40 p.m.

Dec. 18.—Institution of Heating and Ventilating Engineers: Joint meeting with Institute of Fuel, East Midlands Section, at 6.30 p.m.; 'Plant Control through Instruments,' J. E. O. Breen.

WORLD POWER STATISTICS

STATISTICAL Year-book No. 4 of the World Power Conference was published in 1948 and Statistical Year-book No. 5 in 1950. Statistical Year-book No. 6 is now available. Thus, in spite of its title, present-day conditions have brought it about that this is now a biennial publication.

Statistical Year-book No. 6, like its immediate predecessor, contains statistics of the production, stocks, imports, exports, and consumption of power and the sources of power in all countries of the world from which it was possible to obtain information. Data on resources are included only to the extent that important additional or revised data have become available. The International Executive Council of the World Power Conference has decided that complete tables on resources shall be published every six years, normally in the issue of the Statistical Year-book published at the time of a Plenary World Power Conference.

The power sources included in the current Year-book are coal, brown coal and lignite, peat, coke, manufactured fuel, wood, gas, water power, and electricity.

Copies of Year-book No. 6 are obtainable from the Central Office of the World Power Conference, 201, Grand Buildings, Trafalgar Square, London, W.C.2; price 35s., postage 9d.

Sir Hubert Houldsworth, Chairman of the National Coal Board, speaking in Manchester on November 25, said the scientific work now in progress at the Coal Board's central research station at Stoke Orchard might be 'of revolutionary importance to the industry and the country.' He hoped that it would be possible to make smokeless briquettes, suitable for burning in open fires as well as for other purposes, from small coal of types which had hitherto been unsuitable. The whole of the Stoke Orchard station was being devoted to this work, he said, and other research work had been transferred to a second research establishment at Isleworth (Middlesex).

TEACHING AND RESEARCH AT LEEDS

A Survey of the Present Position

by

A. L. Roberts, Ph.D.

Livesey Professor.

IT is a long time since a detailed account of the activities of the Department of Coal Gas and Fuel Industries at Leeds University appeared in the *Gas Journal* and it was therefore with much pleasure that I accepted the Editor's invitation to prepare a brief survey of the present position and the many changes of the past few years.

The Department was the first University school to be set up in Great Britain for teaching and research in fuel and was established shortly after the University received its Charter in 1904. It began as the Department of Fuel and Metallurgy and shared accommodation with the Department of Mining. In 1909 new premises were erected and the Department also received great stimulus from the endowment of the Livesey Professorship by means of the fund acquired by the gas industry in memory of Sir George Livesey. Three courses of action taken in the early history of the Department should be mentioned because of their profound influence on later developments: Firstly, the coupling of the subject of metallurgy with fuel; secondly, the introduction by the first Livesey Professor (W. A. Bone) of refractory materials as a subject for academic study; and, finally, the establishment of the Joint Research Committee of the Institution of Gas Engineers and the University to organise and control research on problems of the gas industry. This Committee was at the time quite a novel organisation and set an example which was widely followed in subsequent years.

In 1912, W. A. Bone was succeeded as Livesey Professor by J. W. Cobb, who brought with him specialised knowledge of the main and ancillary subjects of the Department. He was soon confronted by the problems of the 1914-18 war, during which most of the few students entered the Services and the staff was largely engaged on work for the Ministry of Munitions. In retrospect, however, it is now clear that the first world war marked the beginning of the Department's expansion, largely because of the emphasis which it placed on the national need for organised study of fuel science. In the same period the gas industry had to adjust itself to the changes consequent upon the sale of gas according to heating instead of illuminating power. For these two main reasons the need for the Department's graduates at last became recognised and was shown by an unprecedented registration of students, mostly ex-Servicemen. The numbers in all grades reached 40 and there was pressure on accommodation for the first time in the history of the Department. Since then the problems of accommodation have steadily grown, until today they have become something of a nightmare to those responsible.

Conditions became much more tolerable in 1930 when the Department of Mining occupied its new building and left the old premises for the sole use of fuel. The opportunity was quickly taken to recondition the old building, to give better provision for undergraduate teaching and for the growing demands of research. Professor Cobb retired in 1938 and was succeeded by Professor D. T. A. Townend. Once again the Livesey Professor had to meet war-time problems soon after his appointment. This time the demands were far in excess of those in the first world war; the width of the branches of study within the Department resulted in the services of nearly all of the staff being sought by most of the Ministries as well as by industry, and several notable contributions were made to both offensive and defensive warfare, as well as to science itself. Far from hindering the academic side, however, these developments actually served as a tremendous stimulus—so much so that in 1942 it was possible to establish new and separate degree courses in chemical engineering and in metallurgy. The need for courses in chemical engineering had been accepted in principle by the University in the 1930's, but the sequence of events prevented their realisation until later. The introduction of chemical engineering was greatly facilitated by most generous support from industrialists and more especially from the late Mr. C. F. R.

Brotherton. Concurrent with these developments came a steadily increasing demand for admission to the Department, culminating after the end of the second world war in large numbers of ex-service men anxious to enter the University to resume their interrupted training. It was then that accommodation problems for both staff and students once again began to be acute, as will be seen from the following:—

	1938	1943	1947	1949	1952
Undergraduates ..	12	48	68	90	88
Post-grad. students	10	14	30	29	32
Academic staff ..	8	10	12	15	16
	30	72	110	134	136

The Department Today

The present Department consists of four divisions; Gas Engineering and Fuel, Metallurgy, Ceramics, and Chemical Engineering, all closely interlinked and each contributing its quota to the training of undergraduate and post-graduate students. The growth of metallurgy and ceramics can now be seen as the natural outcome of the introduction of these subjects as necessary ancillaries in the early days of the Department, and chemical engineering followed inevitably from the original courses in gas engineering, themselves broadly based and providing, in effect, training in a special field of chemical engineering.

These rapid developments of the last 10 years or so brought problems other than the severely practical ones of lack of space. The fact that each constituent division as it grew to maturity provided separate courses for both the ordinary and honours degrees of B.Sc. had led to overlapping, some waste of effort, and a trend towards undue specialisation; in addition, there were marked anomalies between the different degree courses. During 1949-50 the courses were therefore reconstructed to overcome these difficulties and to simplify the rather complicated position that had arisen. In brief, only one course is now provided leading to the ordinary degree of B.Sc. in Applied Science.

In this three-year course the student draws upon each of the constituent divisions and receives a broad training in general fuel science. The course is designed more particularly for those intending to enter upon the operational side of a variety of industries and who by outlook and temperament are not so suited for the deeper and more specialised training provided by the honours courses. Although experience with this course is limited as yet, there is good reason to believe that it is achieving its purpose. Further modifications, however, are planned for the near future by introducing additional instruction in industrial administration and the structure and operation of industry.

Four-year separate honours courses are retained in gas engineering, chemical engineering, and metallurgy, and a new course—the first in this country—has been introduced in ceramics. These courses are designed to prepare students for entry into particular industrial fields, as their names imply. Here again, however, it must be emphasised that specialisation is reduced to a minimum. During the first three years all the courses are broadly similar and provide a thorough foundation in pure science and engineering. The student receives a progressive introduction to his chosen field during this period, but his more specialised instruction is left to the fourth year when each of the four types of course diverges into its particular channel.

In redesigning these courses one of the most important issues was whether the training required for entry into the gas industry would be adequately

Professor Roberts

covered by the course in chemical engineering. Our decided opinion, based on the accumulated experience of some 40 years of preparing graduates for the gas and fuel industries, is that the needs of these industries are sufficiently individual to warrant the retention of a separate degree course. The new honours course in gas engineering has, however, been strengthened by additional organic chemistry, mathematics, and engineering subjects as well as by new or redesigned courses in fuel, and it is hoped that the graduates of the future will be at least as acceptable as the many former students who now occupy responsible positions in the industry.

The Accommodation Position

In common with many other University Departments, both the staff and students alike cheerfully cooperate to squeeze the quart into the pint pot. Equipment which formerly rested with dignity on open tables and benches has been relegated to walls—often with advantage—while more and more empty nooks and crannies have been discovered and adapted to hold their quota of apparatus. In this way it has somehow been possible just, but only just, to keep pace with the growing demands for space. Conditions are congested but happy.

But no longer is the Department confined solely within the familiar red-brick building, now bedecked with temporary additions wherever there was space to build. Considerable relief has been obtained by converting nearby house property into laboratories in which many of the research workers are accommodated, while part of the metallurgy division now occupies small but well appointed premises in a building eventually intended to become an extension of the Brotherton Library.

Our need for a new building has long been recognised and it is possible that the plans, now in an advanced state, may begin to be implemented in perhaps a year or two, though of course this depends materially upon the national circumstances. The new building is designed to cater for about double the annual entry of undergraduates (at present about 28) and the post-graduate research school which numbers 30 at the moment. The Architect's sketch of the new building has been drawn up and is reproduced herewith. Past students will be interested to know that the site lies down Reservoir Street, the main entrance being at the junction of this road with Woodhouse Lane. The new Department thus forms the extreme (north) end of the projected north block of the University, a group of buildings which includes new premises for the Engineering Departments on the frontage to Woodhouse Lane, immediately above the present Department of Mining.

Post-Graduate Training in Research

As part of the national scheme for training increased numbers of technologists, the Department has recently received special support from the University Grants Committee to increase its facilities for post-graduate training. The intention is that graduates in pure science or engineering, or suitably qualified candidates from industry, should receive advanced training in the various branches of fuel technology. Similar post-graduate courses have always been available in the past, but it is expected that considerable numbers of students will take advantage of them in their new form; interest in these courses is growing and the school at present numbers 10.

The courses are designed to cover one, two, or three years, according to the qualification of the entrant,

and will lead either to the post-graduate diploma of the University or to the degree of Master of Science, dependent upon whether the post-graduate studies include research work or not.

The Department continues to enjoy the closest co-operation with the gas industry, through the Joint Research Committee, now reconstituted as a partnership between the Gas Council and the University, through the committees and organisations of the industry on which members of the staff are privileged to serve and through personal contacts with the many past students who are to be found in every branch of the industry. Although it points unmistakably to the passage of the years, it is a pleasure to number among our present students sons and nephews of former members of the Department and of senior officials of the industry. Another close and valuable connection is through the eminent members of the profession who each year come to Leeds to deliver the special lecture courses in gas manufacture, purification, and utilisation, as well as in the allied subjects of metallurgy and refractory materials.

The Department is proud of its long connection with the industry. May it grow even stronger in the years to come.

The annual dinner of the Department of Coal Gas and Fuel Industries and the Chemical Engineering Society of the University of Leeds was held on November 21 at the Guildford Hotel, Leeds, the occasion affording an opportunity for former students to meet present undergrads and the Professor and staff of the Department. As customary at these annual events the atmosphere was one of informality and the speeches, with humour and wit prevailing, were largely in domestic vein. The chair was taken by Professor Roberts and the chief guest and speaker was Mr. G. H. Brierley, Managing Director of Brotherton & Co., Ltd., who referred to the present cramped conditions under which the Department had to carry on its unique and extremely valuable activities. The need for more reasonable and more fitting accommodation was certainly urgent.

Among old students at the dinner was Mr. R. Newmann, President of the Coke Oven Managers' Association, 1952-53.

Another Motor Collier, named *Falconer Birks,* was launched on the Forth on November 21 by the Grangemouth Dockyard Co., Ltd., for the North Thames Gas Board, the naming ceremoney being performed by Mrs. Birks, wife of Mr. F. M. Birks, Deputy Chairman of the Board. The new vessel is 257 ft. long with a 39 ft. 4 in. beam. She has a capacity of over 2,700 tons of coal and is powered by an 8-cylinder Clark Sulzer diesel engine developing 1,250 b.h.p. at 232 r.p.m. This is the third vessel of the type to be built at Grangemouth for up-river service on the Thames.

IN PARLIAMENT

Shortage of Pipes

THE shortage of steel and cast-iron pipes in the gas industry was raised at Question Time on November 24 by Mr. GERALD NABARRO (Kidderminster), who asked the Minister of Fuel and Power to what extent such shortage had limited the expansion of the industry in 1951-52; to what extent this affected coal economies that could otherwise have been made; what was the estimated deficit of steel and cast iron supply for the gas industry in 1952-53; and what steps were being taken to meet that deficit in order that the industry might make an optimum contribution to coal conservation and coke and other by-product supplies.

This is the sort of question which, we feel, makes a Minister worth every penny of his salary—or would do so if he had to ferret out the answer himself. As it is, the bulk of the ferreting falls upon the unfortunate Civil Servants in his Department; and in this instance even those persevering individuals found Mr. Nabarro's question too much for them. 'It is not possible,' said Mr. GEOFFREY LLOYD, 'to provide the detailed estimates that my hon. Friend would like; but I am glad to say that recently we have been able to secure some increase in supplies both of steel and cast-iron pipes for the gas industry.'

Was there, perhaps, just a suggestion of wishful thinking in Mr. NABARRO'S supplementary when he naively enquired whether the increase in supplies would meet the demands of the Gas Council in the matter? Mr. LLOYD observed that he did not think in the present circumstances either the Gas Council or industrialists like those in the City of Birmingham, with whom they were both familiar, would expect to have their demands met in full.

Natural Gas

Colonel R. S. CLARKE (East Grinstead) asked the Minister of Fuel and Power what steps his Department was taking to promote the extraction of natural gas in this country.

Mr. LLOYD replied that on natural gas derived from coal seams, he would refer to the reply given to his hon. Friend the Member for Kidderminster on February 4 (see *Journal* for February 13, page 407). Natural gas may also be derived from petroleum bearing strata, added the Minister, and his Department grants licences to prospectors to search and bore for petroleum, including such gas. Forty-two such licences are current covering 6,500 sq. miles, but he understood that geologists did not expect to find substantial quantities of natural gas associated with petroleum in this country.

It was but a step from this subject to that of methane extraction from sewage, and Lieut.-Colonel M. LIPTON (Brixton) asked if the Minister was aware that Government restrictions on capital investments had seriously handicapped the useful work started by the L.C.C. in this direction. The MINISTER replied that there was, in fact, quite a considerable amount of extraction of methane going on in this country at present.

District Heating

Mr. JOHN PARKER (Dagenham) asked the Parliamentary Secretary to the Ministry of Works, as representing the Lord President of the Council, whether the report on district heating schemes had yet been received and what action he proposed to take on it.

Mr. A. H. E. MOLSON, in a written answer, stated that the report on this subject by the Heating and Ventilation (Reconstruction) Committee of the Building Research Board of the D.S.I.R. had been received. This report would be published as soon as possible as Volumes 31 and 32 in the series Post-war Building Studies.

Visual Aids for Schools

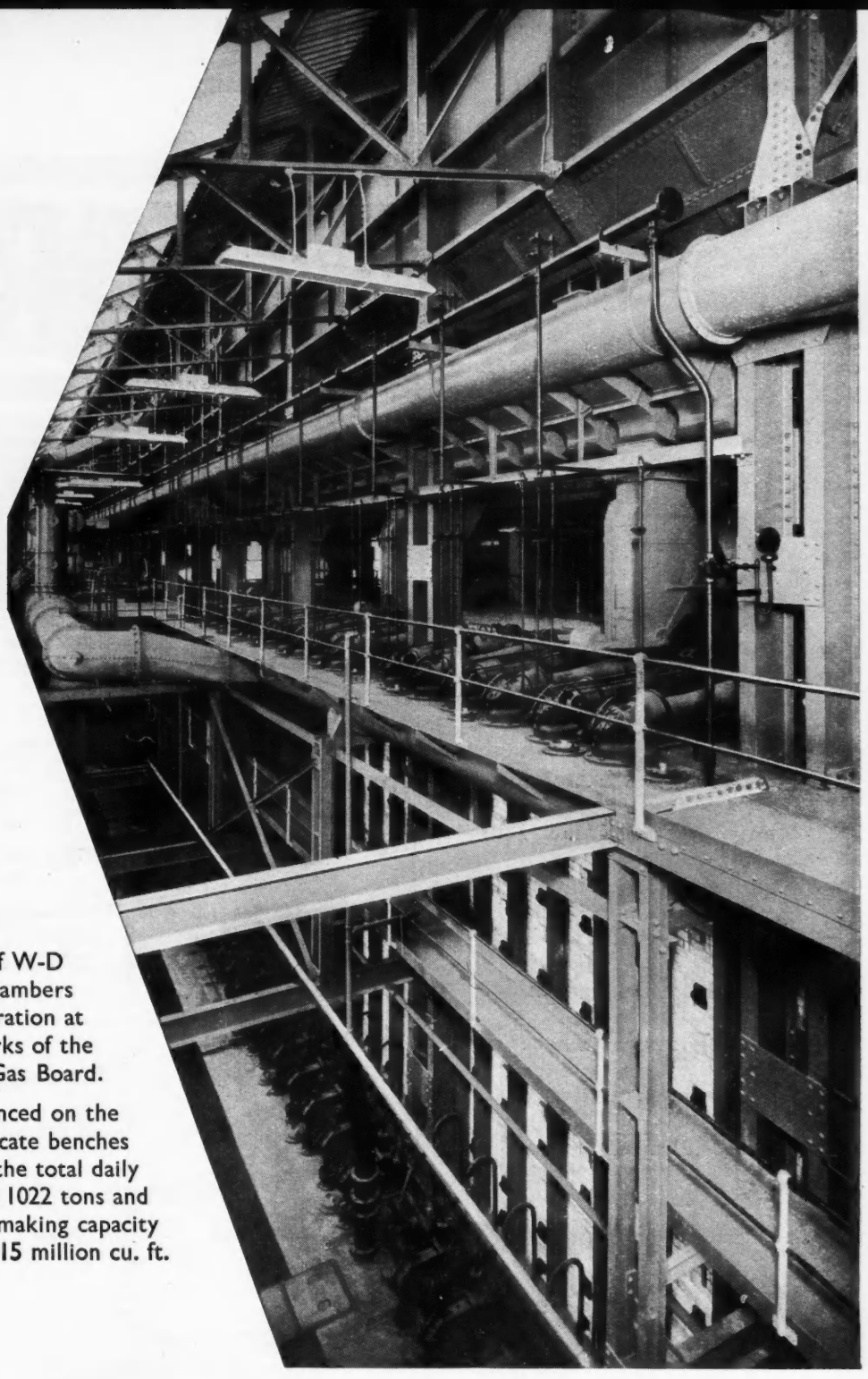
MISS BLACKMORE, Senior Inspector for Domestic Science, London County Council, recently organised a one-day conference for domestic science teachers from grammar schools in the Council's area. This gathering of specialist teachers provided an excellent opportunity for the North Thames Gas Board's Public Relations Department (in co-operation with the South Eastern Gas Board) to display a comprehensive exhibit of the visual aids and facilities which are available on free loan from the Boards to schools in the London area.

The display material, instructional charts, models and sectional appliances which were shown at the County Hall aroused considerable interest among the visitors. Incidentally, these were the only visual aids on view at this meeting —no other industrial concern being represented.

Easiclene Refrigerators

A new Domestic Equipment Section has now been formed within the Rubery, Owen & Co., Ltd. organisation. Easiclene Porcelain-Enamel (1938), Ltd., has taken over the marketing of 'Castra' electric washing machines and 'Gasel' absorption type refrigerators (both made within the organisation), in addition to the already widely known range of Easiclene kitchen and bathroom equipment.

All products will be marketed under the trade name 'Easiclene' and coverage will be directed by: Midlands and Northern Area Sales Manager, Mr. R. C. Brewer, Darlaston, South Staffordshire; London and Southern Areas Sales Manager, Mr. Leopold Friedman, Kent House, Market Place, Oxford Circus, London, W.1; Export Enquiries, Mr. J. M. Garrett, Export Dept., Kent House, Market Place, Oxford Circus, London, W.1.



W-D

o of the four benches of W-D
ntermittent Vertical Chambers
oon to be put into operation at
the Tingley Works of the
North Eastern Gas Board.

Already work has commenced on the
building of four duplicate benches
which will increase the total daily
carbonising capacity to 1022 tons and
the total daily gas making capacity
to 15 million cu. ft.

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THE **WOODALL-DUCKHAM** VERTICAL
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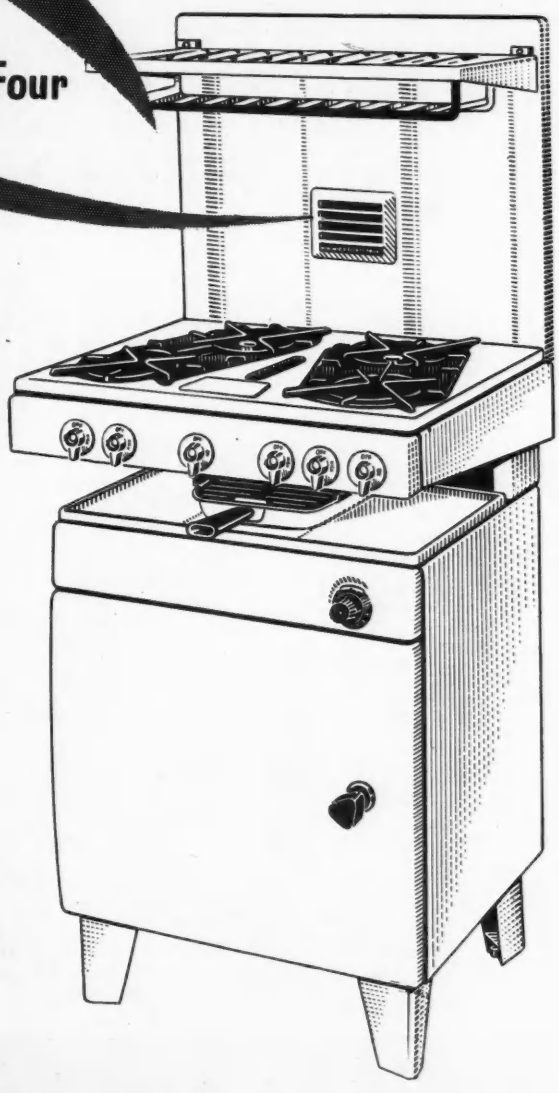
The NEW WORLD Eighty Four



The NEW WORLD EIGHTY FOUR has been developed to provide the housewife with a cooker which will meet all her needs on every occasion throughout the year. Each of the main units, the hotplate and the oven, has been designed independently so that it is correct in size and shape for the maximum work it will be called upon to do, be it jam making, fish steaming or roasting a 22-lb. turkey.

Both these cooking appliances have Fine-control safety taps and forward-venting flue systems enabling them to be fitted flush to the wall.

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THE POPULAR COOKER WITH THE BOW FRONT

MEDIUM PRICE ●
HIGHLY EFFICIENT ●
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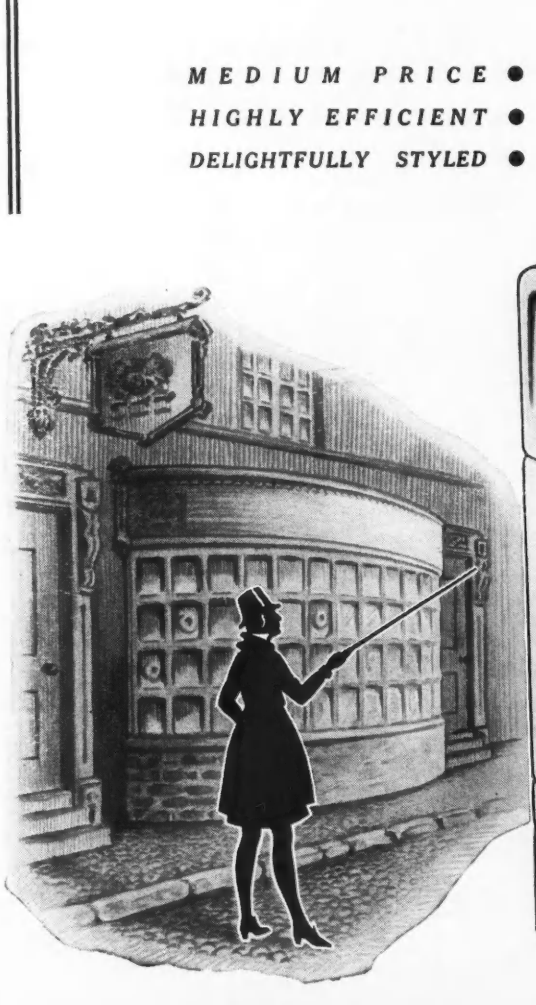

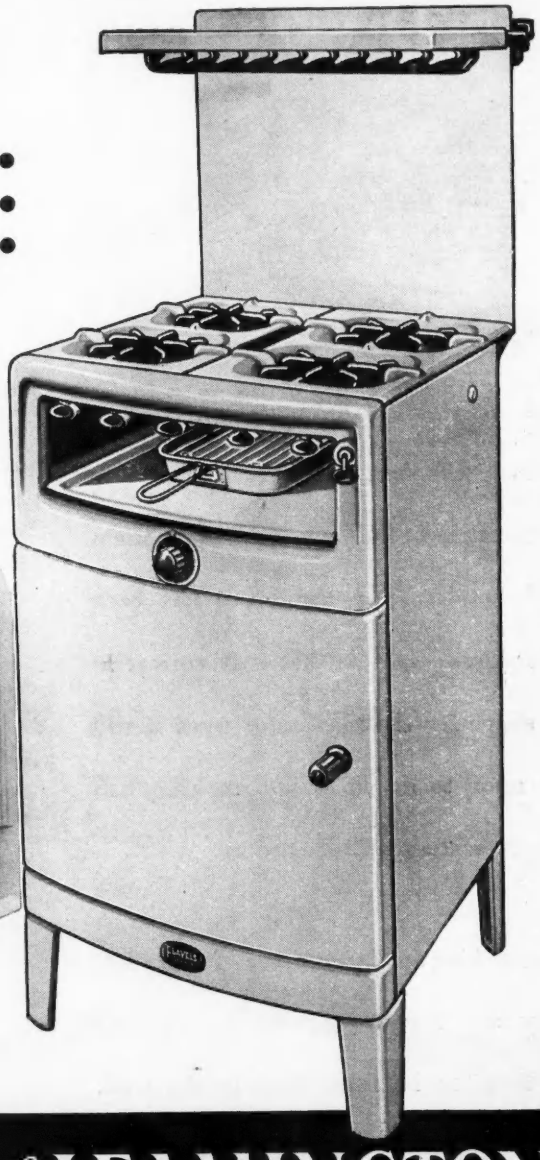

FLAVELS *of* LEAMINGTON

MAKERS OF FINE QUALITY COOKING & HEATING APPLIANCES SINCE 177

THE use of water heating appliances in summer and the relation between the usage of hot water and the appliances available form the subject of National Building Studies Special Report No. 14, being Part II of an enquiry into domestic hot water supply in Great Britain instituted by the D.S.I.R. in April, 1950. It follows Part I published in March, 1950, under the title of 'Distribution of Water Heating Appliances and their Use in Winter.' In the following article we have endeavoured to pick out some of the salient points from the latest report which may be of interest to those concerned with the domestic gas water heating load.

Summer Hot Water Supply . . .

. . . A National Survey

The winter survey covered some 6,000 households, of which it may be noted that 7% had no piped cold water supply, 12% no bath, and 54% no bathroom. Of the 7,380 water heating appliances found in these households the number of gas storage and electric storage and immersion heaters was too small for their distribution to be taken as representative of the country as a whole. Consequently, too much emphasis should not be placed on the relative degrees of satisfaction in connection with these particular appliances. Nevertheless, some interesting points emerge. For example, of 54 gas storage heaters in the winter sample, 36% were stated to be unsatisfactory for summer water heating. The three principal complaints were: (a) Too long to get hot (21%); (b) too expensive to run (19%); and (c) not enough hot water at a time (9%).

Instantaneous gas water heaters, on the other hand, appear to give higher consumer satisfaction. Of the 633 single-point heaters in the sample 80% were stated to be satisfactory for summer use. Chief causes for complaint were: (a) Necessity to run water slowly (8%) and (b) too long to get hot (7%). Though the sample covered a much smaller number of multi-point heaters, consumer satisfaction was rather lower at 68%, the biggest objections being: (a) Water does not get hot enough (18%) and (b) necessity to run water slowly (16%).

Satisfaction with Copper

Of all types of gas water heater the humble copper gained the highest degree of consumer satisfaction for summer use—namely, 90% of 1,826 samples—the principal complaint, amounting to no more than 4%, being the length of time taken to get hot. It is interesting to note that as many as 38% of gas coppers are used for heating bath water in summer, though only 1% for this purpose alone. Only half of them are used solely for clothes washing, which shows that the gas copper has a wide field of use in the average household; 4% of the sample use it for *all* domestic water heating, while 7% of those who have coppers do not appear to use them at all in summer.

For Baths

The report contains information relating to the use of hot water for baths, obtained from the result of two national surveys. The observations are qualified by the fact that any data concerning personal habits are liable to criticism on the score that there is always a tendency for people to say they take baths more frequently than they actually do. However, although the absolute figures may be open to doubt, their relative values are indicative of the extent to which there is a desire for baths. It should be noted, too, that not all baths are taken at home. For instance, in the winter survey 9% took some or all at public baths, 6% took some or all elsewhere, while 5% were in the no-bath category.

Of 5,000 winter samples in this particular survey, where there is one method only of water heating, gas appliances of one kind or another account for 768 cases and electricity 337. It is a sad reflection upon 'modern living' that more than one in every five households still heat all their bath water in kettles and pans. Needless to say, Saturday remains the traditional bath night, though Friday runs it pretty close. There is no seasonal variation in this preference which is also found to be maintained for urban and rural districts and for all the economic groups.

In four out of five of the economic groups—*i.e.*, all but the lowest—there is a desire for more hot baths in two-thirds of the households. In the highest group, where baths are now taken most frequently, a one-third increase is desired, and it can be expected that with improved hot water facilities 64% of households will take more hot baths and that the average number of baths per person will increase to about three per week as compared with the average disclosed by the survey (for persons five years of age and over) of 1.6 in winter and 2.0 in summer.

A fact brought out by the survey of clothes washing is that the lowest economic group contains the highest proportion of households sending items of personal clothing to the laundry—the conclusion being that this tendency probably reflects lack of facilities in the home. The proportion of households using a laundry regularly is just over 40% for both summer and winter. Fewer households use a laundry regularly in rural areas than in urban, due probably to the smaller number available.

The proportions of households where coppers are the only water heating appliance making regular use of laundries are: Solid fuel, 20%; gas, 27%; and electric, 36%. Where there are other appliances in addition to the copper, the possession of the extra appliances does not appear to affect regular use of a laundry to any considerable extent. In households not having a copper, twice as many use a laundry regularly as in households having a copper. In the highest economic group 70% of housewives express satisfaction with their hot water supply, but nevertheless 74% of these use a laundry regularly.

One in five households in urban areas and one in three in Scotland and in the London area would do more washing at home if there were an improvement in the method of obtaining hot water.

Dish Washing

In general, fewer appliances are used for heating water for dish washing in summer than in winter; this is true for all types of appliances except the single point geyser, where no seasonal variation is shown, and coppers, where slightly more are used. The inference is, of course, that greater use is made of kettles and pans for this purpose in summer. There may also be less need of hot water for dish washing in summer, at least for certain types of meals.

The mean satisfactory temperature of water used for dish washing was 118°F., with a standard deviation of 10°F. It is necessary to consider this mean figure from the point of view of sterilisation. If the final rinse is in very hot (not less than 180°F.) clean water, the crockery is practically sterilised and will quickly dry in the air without application of a possibly infected drying cloth. The gap between the mean figure of 118°F. and 180°F. raises important issues. A temperature of 140°F. is usually accepted as adequate for domestic hot water supplies. At temperatures higher than this, troubles with scale are accentuated in hard water districts, and heat losses from unlagged cylinders and pipework are greatly increased. In addition, there is a risk of scalding, and crockery at high temperatures becomes difficult to handle.

Water Temperature

This subject of water temperature has a section to itself in the report. No attempt was made in the main surveys to obtain information on the temperature at which hot water was used, but a small survey was carried out among members of the staff of the Chief Scientific Adviser's Division of the Ministry of Works (which was responsible for the investigations summarised in Part I of this enquiry) in the London region.

The mean satisfactory temperature for bath water was 105°F., with a standard deviation of 4°F. The sample comprised 97 persons of both sexes and included adults of all age groups as well as children of 10 years of age and over. The sample for the dish washing survey comprised 33 households of various types and sizes. The average temperature of 'hot' water used shows no seasonal variation, being 120°F. in both winter and summer. The average temperature of 'warm' water used is 105°F., which is identical with the average temperature of bath water. It is observed that 'very hot' water is rarely used.

Hot Water Consumption

Great variation was found in the amounts of hot water used. Measurements of quantities used by households for specific purposes only, at an equivalent temperature of 140°F., show a range of from less than 50 gal. to over 1,000 gal. per week. Within these limits, however, there is a discernible pattern of behaviour. The number of baths taken in a week may be regarded as a measure of seasonal variation in view of the quantity of water required.

The average equivalent consumption of hot water at 140°F. per household ranges, according to the type of appliance, from 77 gal. per week in winter and 69 gal. per week in summer for households with no appliances—*i.e.*, all water heated in kettles or pans—to 428 gal. per week in winter and 408 gal. per week in summer for households with hot water laid on by direct supply. The seasonal variation in consumption with any particular appliance is thus relatively unimportant in comparison with the great differences occurring with different methods of obtaining hot water. Within this range, gas heaters showed an average weekly consumption of 258 gal., and immersion heater with solid fuel appliance 293 gal.

It is considered that variations in consumption are more likely to be due to differences in economic circumstances than to any other factor.

No specific enquiry was made, in any of the surveys, into the cost of water heating. In any case, it is usually difficult to separate costs of water heating from those of space heating, whether or not space heating is required when hot water is needed. Some evidence is available, however, states the report, which suggests that for consumptions in excess of 250 gal. per week during the summer, solid fuel is likely to be cheaper than gas or electricity at the prices ruling at the time of the field work, and that for consumptions below 200 gal. the cost of electricity or gas is likely to be lower. Although prices have in the intervening period increased, the ratios have remained substantially unaltered, and the conclusions are probably still justified.

In the summary and conclusions it is observed that appliances are found to be more satisfactory for water heating in summer than in winter, though the space heating function of many appliances causes serious inconvenience in hot weather. The high level of satisfaction with the performance of coppers (or wash boilers) heated by gas or electricity shows that these appliances are efficient for the purpose for which they were designed; it does not mean that the copper is considered a satisfactory method of heating water for all purposes.

In conclusion, it may be of interest to reproduce the following table from Appendix 5 of the report showing the distribution of appliances in the National Survey in relation to a census taken by the North Thames Gas Board. While it would be expected that the gas figures, in view of the nature of the sample, would be higher for the Gas Board's area than for the National sample, the two sets of figures, apart from a high concentration of gas coppers, do not show wide divergencies.

PERCENTAGE OF HOUSEHOLDS WITH

	March 1947 National Survey, London Region	North Thames Gas Board (per 100 domestic gas consumers)
SOLID FUEL		
Inset fire	10	
Fire with oven	5	
Fire with oven or inset fire	15	
Back boiler (fire with range)		18
Independent boiler	17	16
Copper	13	7
GAS		
Multi-point heater	3	
Storage heater	1	
Multi-point heater or storage heater	4	
Multi-point heater (including storage heater circulator)		5
Single-point geyser*	17	
Single-point heater: to bath		10
Single-point heater: to sink		7
Single-point heater: to bath or to sink		17
Copper	13	29
ELECTRIC		
All water heating appliances	11	
All water heating appliances (excluding all-electric dwellings)		7

* Some households have more than one single point heater.

Reconditioned Cookers are being made available by the Eastern Gas Board for sale and on hire-purchase terms which will be comparable with the terms offered for electric cooking appliances in the area.

A Statement Made at a meeting of the Tees-side and South West Durham Chamber of Commerce that an increase of 50% in gas charges was to be effected from January 1, has led the Middlesbrough Division Consumer Committee to send a strong protest to the Chamber. In a letter, on behalf of the Committee, Alderman Joseph Hoy, Chairman of the Northern Gas Consultative Council, states that there is no foundation of truth for such a claim and adds: 'Such statements are damaging to the gas industry and likely to cause unnecessary concern to both domestic and industrial consumers.'

Four Employees of the Wales Gas Board, who between them have given 180 years' service to municipal gas undertakings in various parts of the country, were presented with long service certificates and monetary gifts at a ceremony at Rhyl on October 31. The recipients were Mr. Clifton Wyver, who had been connected with the gas industry for 49 years and had been Manager at Denbigh for the past 35 years; Mr. Howell Parry, a foreman at the same works, who had been 45 years in the industry; Mr. Fred Williams, leading stoker at Rhyl, who had 41 years' service and Mr. Arthur Barton, a foreman fitter at Mold, who had 45 years' service in the industry.

Foster Transformers, Ltd., have published a leaflet entitled 'Principal Products' which illustrates numerous items of equipment manufactured at their South Wimbledon works.

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The thrill of building—and of dimantling to build again—is equally satisfying in the Meccano world of boyhood as in the work-a-day world of progressive industrial development. In one case, today's crane becomes tomorrow's battleship; in the other, obsolete plant and out-dated production units make way for new and more efficient installations. In both the emphasis is on *constructive* dismantling.

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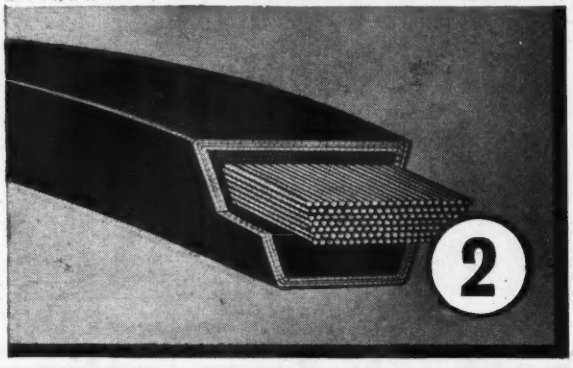

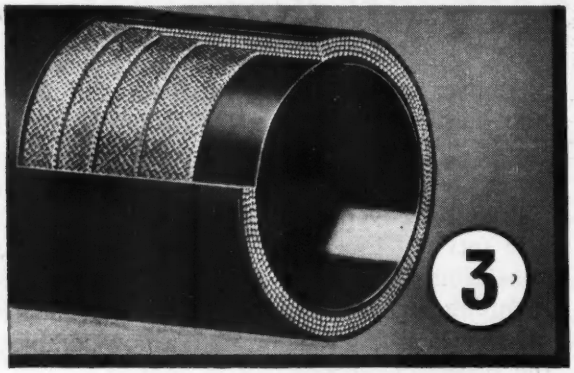

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1 GOODYEAR CONVEYOR BELTS

The "Stacker" belt illustrated here is designed for installations which handle highly abrasive materials. Its tough, resilient cover "gives" under impact and resists cutting. High-grade bonding between the plies prevents separation under severe flexing. It is proofed against the ruining effects of mildew.

2 RAYON CORD V-BELTS

Goodyear Rayon V-Belts are ideal for all industrial drives, especially those longer, normal speed drives where shock loads occur. They stand up to sudden jolting loads that would break ordinary belts, for they contain strong, resilient high-tensile rayon cords which "give" without snapping.

3 WRAPPED PLY HOSE

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CHICKEN IN THE KITCHEN

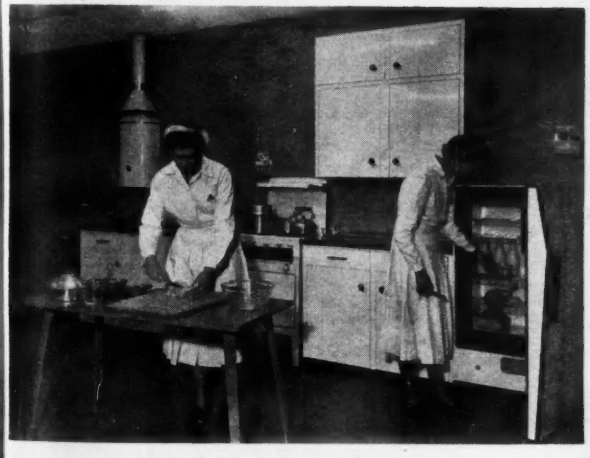
Mrs. Hilda Whitlow demonstrates one of her special dishes on the Gas Council's stand at the National Poultry Show at Olympia.

IN looking at some of the exhibits at the Poultry Show at Olympia one is irresistably reminded of the little note which prefaces works of fiction, which we might paraphrase in the words: 'Any resemblance between this exhibit and our own hybrid collection of barnyard fowls is purely coincidental.' We gaze with awe at these magnificent birds and wonder, but dare not ask, whether they also lay eggs. One might almost be forgiven for doubting it in the case of some of the more exotic specimens whose variety of brilliant colours is only equalled by their Lilliputian size.

Resisting the temptation to digress upon the relative merits of Faverolles and Frizzles, Sebrights and Silkies, we turn to the part which the Gas Council played in this National show. The Council's effort was concerned with dead poultry rather than with live ones and formed a major part of the 'Chicken in the Kitchen' section. While at first thought one regrets the complete absence of any tie-up with the commercial side, it must be conceded that examples of gas heated incubators and brooders, or any of the other appliances which the industry can offer to poultry breeders, would have been out of place on a stand of this kind. We are not entirely convinced that this policy of completely ignoring the commercial side is right, since this show provides an outstanding opportunity for showing what gas can do for the poultry breeder. However, we will not labour the point further at this stage.

The 'Chicken in the Kitchen' section is designed to show housewives how to cook a variety of poultry and egg dishes on gas, electric, or solid fuel cookers, and the exhibit this year incorporated four kitchens, in two of which the cooking was by gas. The Gas Council section was divided into two parts—the demonstration section, seating over 50 persons, and the preparation room (also open to the public) which, in addition to the appliances used in connection with the practical demonstrations, contained a display of up-to-date gas equipment for all culinary purposes. Hilda Whitlow, of *Homes and Gardens*, conducted the gas demonstrations, while in this section, too, M. Gustav Frieberg, late of the Café Royal, gave demonstrations on the correct way to carve.

In the English Rose Kitchen the cooking was also by gas—using a Flavel cooker specially moulded to conform to the attractive design which is standard throughout the range of English Rose equipment. In the Rural Kitchen an Ascot water heater was operating on calor gas, an Electrolux refrigerator on oil, while the actual cooking was carried out on a Radiation 'Yorkvale' solid fuel appliance.



Jenifer Bland and Penelope Garnham are seen in the well equipped preparation kitchen which formed part of the Gas Council's exhibit at the Poultry Show. This kitchen was open to the public.

We discovered a novel use for gas at the Poultry Show. Noting an Ascot heater fixed (a little crudely perhaps) high up on a pillar in the Grand Hall, we asked what it was for. We discovered that it provided warm water for the tropical fish and baby alligator tanks. What we failed to discover, however, was what tropical fish and baby alligators were doing at a poultry show.

The complete range of equipment in the Gas Council section was as under:

DEMONSTRATION KITCHEN

Manufacturer	*Appliance*
Radiation Group Sales, Ltd.	3518 cooker
Ascot Gas Water Heaters, Ltd.	RS.52/1 boiling water heater
Electrolux, Ltd.	L.300 refrigerator
Sidney Flavel & Co., Ltd.	68/16 cooker

PREPARATION KITCHEN

Ewart & Son, Ltd.	M.210 multipoint water heater
Stoves, Ltd.	XI cooker
Easiclene Porcelain Enamel (1938), Ltd.	Easiclene refrigerator

DISPLAY

Cookers

Parkinson Stove Co., Ltd.	Paragon cooker
Cannon (Holdings), Ltd.	A.125 cooker
R. & A. Main, Ltd.	Century cooker
Thos. de la Rue & Co., Ltd.	G.5 cooker with short splash plate

Laundry Equipment

W. H. Dean & Son, Ltd.	970 washing machine
Morley Products (Padiham), Ltd.	46 wash copper

Rings and Hotplates

Sidney Flavel & Co., Ltd.	Duette hotplate
John Harper & Co., Ltd.	3177 hotplate
Radiation Group Sales, Ltd.	Hearth boiling ring
Ascot Gas Water Heaters, Ltd.	FA.1 boiling burner

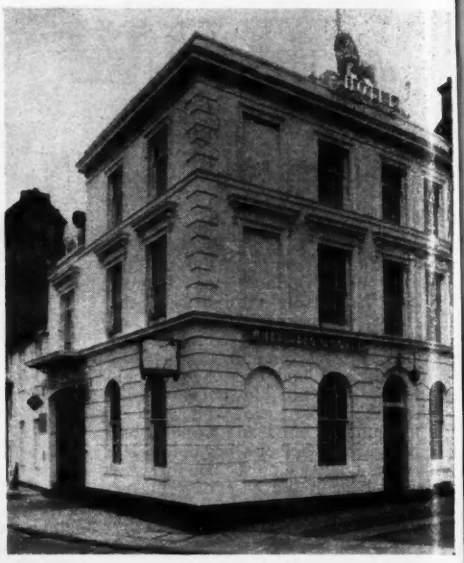
Refrigerator

Astral Equipment, Ltd.	Astral refrigerator

A Mess Room in which they can take their meals and have shower baths has been provided for about 90 manual workers employed by the Kettering undertaking of the East Midlands Gas Board. Until the brick-built asbestos-roofed building was opened a fortnight ago these employees had only a wooden shack in which to eat and there were no washing facilities. Four showers will serve the needs of half the manual workers whose work is of the dirtiest, although the facilities will also be available to other workers. Twenty-four lockers are provided, each divided into two for dirty and clean clothes. There are also six wash basins, a drinking fountain and clothes drier heated by steam. In the mess hall three tables each seat eight.

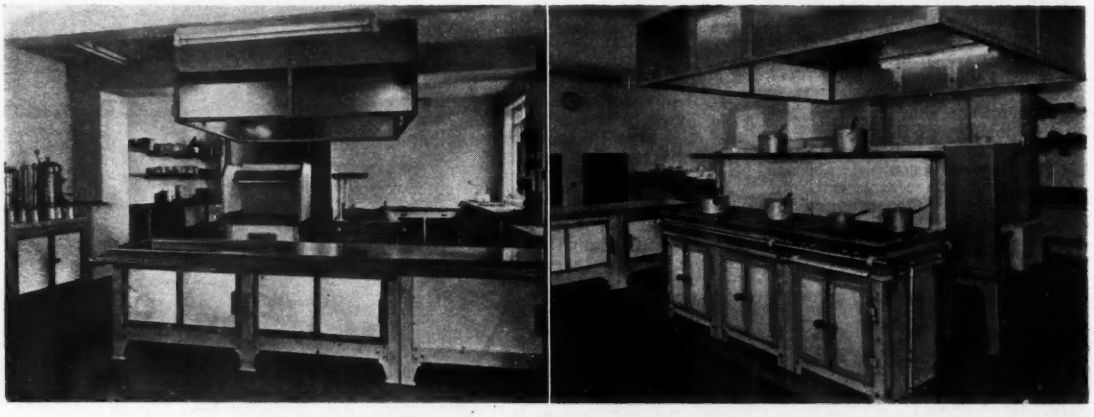
Old-World Hotel Modernised with Gas

A pleasant reminder of more leisurely days, the White Lion Banbury, is a fine example of a skilfully modernised hotel under wise management. This charming hotel, which at height of the coaching era offered accommodation for 86 horses, retains all the character and features of the past so beloved by the tourist, yet provides amenities and service of a standard in keeping with the modern age.



The White Lion

IN common with so many establishments whose origins are steeped in history, the layout of the kitchens left much to be desired, and in this case, they were originally situated on the opposite side of the inn yard from the dining room, food having to be carried across the open yard in all weather. In collaboration with the Banbury undertaking of the Southern Gas Board, a new kitchen was planned and equipped by R. and A. Main, Ltd.



Two views of the gas equipment in the modernised kitchen

Under the supervision of the hotel chef, Mr. F. Booth, it is now ideally situated between the two dining rooms, with direct access to both. The equipment in the kitchen includes a 10 ft. 6 in. run of gas-heated service counter with inset bain marie; a Main DYWU 3/93 treble-oven gas range with unit pattern hotplate, one unit of the open type and two units of the solid type; a GS.1420 gas steamer; a SP.937 gas stock pot stove; a single-pan fish fryer; Main GG.24 and GG.225 gas grillers; and a gas-heated café set complete with milk and coffee urns. A glass ceiling curtain with mechanised extract ventilation is over the central block of equipment, storage and cold room facilities are adequate, while ancillary equipment and wash-up are ample for the needs of the establishment.

No reference to the White Lion at Banbury would be complete without mention of its truly magnificent Wistaria tree, now some 200 years old and covering over 200 ft. of the wall of the inn yard. The Curator of Kew believes it to be the oldest tree of its kind in the country and it is thought it may have been grown from seed brought into the country by seamen before the trees themselves were imported.

The 200-year-old Wistaria tree

A view of the hotel dining room

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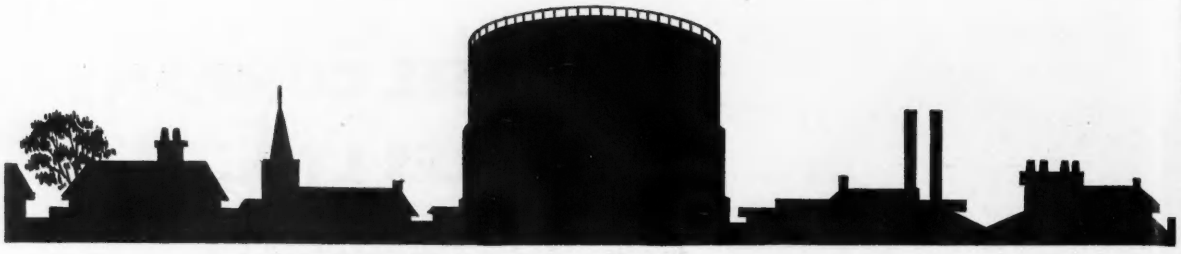

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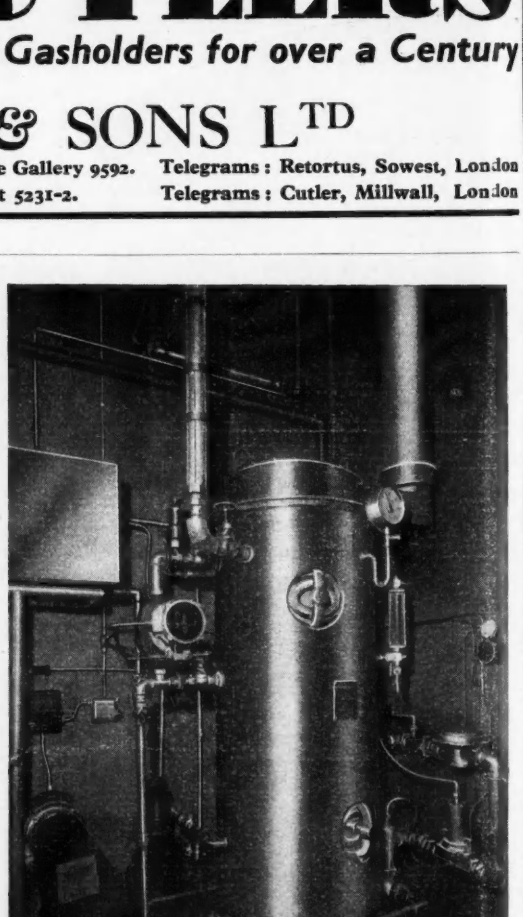

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SMITH METERS STAFF DINNER

SMITH METERS, LTD., held their annual staff dinner and dance at the Caxton Hall on November 22, with Mr. NORMAN L. SMITH in the chair. The toast of the Chairman and Directors was proposed by Mr. C. R. F. Taylor, who praised the team spirit which was so ably led by the Directors and the great encouragement the Board gave to all members of the staff for their advancement in the firm. Mr. Smith, the fourth generation of the founder, was carrying on the tradition of 118 years. In the death of Mr. Arthur Charles they had lost one who tried to do more for his firm than the body would allow.

In replying, Mr. Norman Smith reviewed what he said had not been an easy year, owing to curtailed buying by the industry, but he was very pleased to be able to say that their firm had more than maintained the high percentage of meters sold to the industry. They had suffered a very great loss by the death of Mr. Arthur Charles, and he would always be missed. Mr. Basil J. Smith and Mr. F. King, he continued, were now jointly running the Streatham factory. With the incorporation of Alder & Mackay, Ltd., that fine Scottish firm, into the U.G.I. parent group of companies, he was very pleased to welcome Mr. H. Bennet to their Board. He had known Mr. Bennet for twenty years as a competitor and friend; now they had him as an ally and the highest recommendation was to say 'He is a true Scot.' The future outlook for the firm was excellent, and they could look forward to crowning achievements in the Coronation year.

Mr. Basil Smith proposed the health of the many guests, referring to them in two categories—the husbands, wives and sweethearts of members of the staff, whom he was delighted to see there on this occasion, and also the large gathering of friends of long standing among their professional colleagues, suppliers and personal friends, all of whom played important parts in the constant development of the firm. Mr. Vernon Cheshire replied for the guests.

As in past years, John Mills, the well-known toast master, was M.C. of the function, and a very happy evening was spent dancing to the orchestra of Sydney Jerome.

Dublin Gas Price

THE PRICES ADVISORY COMMITTEE in the Republic of Ireland has heard an application by the Alliance and Dublin Consumers' Gas Company for an increase in the price of gas by 1.75d. per therm which, it was stated, was necessitated entirely by increased costs and wages. The increase, if granted, would raise the price in Dublin area to 1s. 11d. per therm, an addition of 8.2%.

Mrs. A. Skeffington (Irish Housewives' Association), opposing the application, pointed out that increases of 1½d. and 1½d. per therm had been granted last year. She was opposed to the further subsidising of the shareholders by the consumers. The company's net profits had increased, she said, from £67,761 in 1950 to £73,528 in 1951.

Mrs. M. O'Carroll (Lower Prices Council), while regretting the necessity for the proposed increase, said that it was not exorbitant. She asked for a review of the position in about three months in view of a possible reduction in the price of coal.

The Committee will make its recommendations to the Minister for Industry and Commerce in due course.

Gas Heating Recommended for Middlesbrough Town Hall

THE Town Hall and Municipal Buildings in Middlesbrough, including the police station and court, will be heated solely by gas boilers, if a recommendation made by the Corporation Estates and Development Committee is adopted by the Town Council.

The committee made its decision after a lengthy interview with two consulting engineers of a Newcastle firm, who have submitted a report on the comparative merits of gas, oil, coal and coke heating for the boilers. Part of the Municipal Buildings is at present heated by a gas installation. The work of overhauling the system for the whole of the buildings will cost about £20,000.

The engineers, in their report, stated that the heating was at present deficient by modern standards both in boiler capacity and radiators. They recommended that the buildings should be heated either by one central set of boilers or by four separate boiler houses, instead of the present arrangements whereby use is made of electricity, coal and gas in heating the various parts of the buildings. The capital cost for oil firing would be slightly higher than coal, but running costs would be considerably higher.

The total annual cost for coal, one of the engineers told the committee, would be £1,700, for gas £2,225, for oil £1,975 and for coke £2,360.

Proposing that the buildings should be heated entirely by gas, Alderman F. C. Pette said: 'It will be a very wise step. It will mean that we shall save on labour because we shall not have to have a man employed on the boilers all day long.' Oil, he said, would entail storage accommodation.

Councillor Sir Edward Anderson, who seconded, said the little extra cost would be negligible when they considered the cleanliness that would be effected and the saving in space.

The committee decided to recommend that there should be four separate boiler houses.

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TRADE NEWS

Horstmann Gear Co.

AN interesting form of thermal sensitive element having unusual and valuable characteristics for flame failure protection devices is being developed by the Horstmann Gear Co., Ltd.

It is based on the simple principle that if a source of concentrated heat (for instance a gas flame) is applied to one side of a metal rod, the side being heated expands more than the other side and the rod is caused to bend. Immediately the source of heat is extinguished, the heat rapidly equalises through the rod which then straightens out, without the rod necessarily having cooled. Thus is obtained a very rapid response.

The amount of bending of the rod is directly proportional to the difference in the temperature of the heated and the unheated sides of the rod. This difference is determined by the rate at which the heat is conducted through the rod. This is so rapid when a solid rod is used that very little differential temperature and, therefore, very little bending can be obtained, certainly not enough to be of much practical use.

If, however, a tube is substituted for the rod, the heat travels much more slowly round the tube and much of it is lost on the way by radiation. Consequently a very much greater heat differential occurs, and sufficient bending of the tube is obtained to be of practical use.

In practice, these sensitive units are made from a stout piece of heat resisting steel tube firmly mounted in a valve block having suitable gas connections. The sensitive tube is plugged at its outer end, the plug carrying a stiff rod which projects backwards through the sensitive tube into the valve body and is used to operate a simple valve. The amount of move and the mechanical power available to operate the valve are considerable.

Built into the valve body is a simple burner fed from a separate connection in the valve body and arranged to play on the side of the sensitive tube to operate it, and the same flame can and should also be the constant pilot to ignite the main burners.

Such a unit can be connected in the bleed line of any gas appliance using a relay thermostat system and will close the relay within a few seconds if the pilot is extinguished.

The sensitive unit and its associated circuit can, of course, be elaborated to provide full protection to the pilot as well as the main burner supply and to multiple burner banks each with their own pilots.

The device is simple, mechanically robust, almost indestructible by heat, very fast in response, and inexpensive.

The Horstmann Gear Co. is engaged on studying the application of this device to various types of gas burning appliances and safety circuits and will welcome enquiries for specific applications. —*Horstmann Gear Co., Ltd., Newbridge Works, Bath.*

Parkinson & Cowan

WE have received from Parkinson & Cowan (Gas Meters, Ltd., Engineering Division) particulars of a new portable test meter which the firm is placing on the market. There are three types of this meter. Type A—a laboratory meter with helical drum, having a range from 0.02 to 20 cu.ft. per hour. Type B—copper cased test meter with a capacity of 6 cu.ft. per hour, and Type P, which is sub-divided into four models having capacities respectively of 18, 2[illegible] 60, and 120 cu.ft. per hour.

These meters are fitted with fine adjustment sight waterline gauges levelling screws, and spirit levels. They are

set with great accuracy and the index work is very light running so that the meters are adjusted to work with the minimum of friction. In addition to showing the actual quantity of gas passing, the dials have a circle by which the hourly rate can be ascertained by observation of one minute.

Type B meter is the usual form of wet laboratory meter having a four partition measuring drum and is manufactured in either stainless steel or soft metal. The meter operates to Hyde pattern—*i.e.*, inlet pressure to outside of drum—but is waterlined under static conditions. The whole of the meter, including screws securing the back plate, except for the chromium plated fittings, is plated both inside and outside with Nickelex before being electro-tinned.—*Parkinson & Cowan (Gas Meters), Ltd., Cottage Lane, City Road, London, E.C.1.*

Trade Publications

WELLINGTON TUBE WORKS, LTD.—A new catalogue (No. 66) giving details of the firm's many products with full specifications and a wealth of technical data. It is excellently produced and copiously illustrated, many of the photographs being in colour.

KEITH BLACKMAN, LTD.—A recently published catalogue, Publication No. 23, giving details of 'Tornado' paddle wheel type fans. Containing forty fact-filled pages, this catalogue lists, illustrates and describes in detail 'Tornado' standard belt-driven, paddle wheel type fans ranging in size from Nos. 8 to 40.

E. C. & J. KEAY, LIMITED

CONSTRUCTIONAL ENGINEERS AND IRONFOUNDERS

Head Office:
"Runnymede,"
Stratford Road,
Henley-in-Arden,
Warwickshire

Also Offices
at
LONDON
SOUTHAMPTON

Cast Iron Purifiers temporarily erected in our Works prior to despatch

Specialists in TANKS, Steel or Cast-Iron, Riveted or Welded, etc.
JAMES BRIDGE WORKS, DARLASTON

SILLIMANITE
BAUXITE
AND OTHER HIGH
ALUMINA PRODUCTS

INSULATING
FIREBRICKS
THREE GRADES FOR USE
ON EITHER HOT FACE
OR BACKING

WILLIAMSON, CLIFF LTD.
STAMFORD

RETORTS
FIRECLAY AND SILICEOUS
WHOLEPIECE AND SEGMENTAL TO GAS ENGINEERS'
SPECIFICATION
PATCHING CEMENT

TELEPHONES:
STAMFORD 3316
VICTORIA 5351

FIREBRICKS
SPECIAL SHAPES
36% TO 42% ALUMINA
FIRECLAY BLOCKS
JOINTING CEMENT

GAS METER CRANKS

Telephone: DUNSTABLE 90

The Clifford Engineering Co., Ltd.

Dunstable, Beds.

Specialists for over 30 years

Annual production over 700,000 cranks

EWART CHAINBELT CO., LTD.

DERBY, ENGLAND

Driving and Conveyor Chains of the best quality; made of Ley's Celebrated Blackheart Malleable Iron.

ALSO COMPLETE CONVEYORS AND ELEVATORS

HAWKINS

IMPERISHABLE

JOINTING PASTE

Non-poisonous, cheaper and better than red lead, ideal for gas, steam or water.

IRON CEMENT

Looks like iron, can be buffed burnished or drilled and automatically caulks itself into any joint.

Also Manufacturers of Hawkite Paint.

W. T. HAWKINS & CO.

CHAPEL HILL, HUDDERSFIELD

Send for Sample Tin POST FREE

Sole Agents for Australasia:
W. T. HAWKINS (Australia) Pty. Ltd.
Hardware House, Hardware Street, Melbourne, Australia

n.d.h.

CRANE
LTD

Specialists in the repair of defective Reinforced Concrete Structures, etc:

LININGS TO STEEL BUNKERS
RESERVOIRS, TUNNELS, ETC.

GUNITE

CONSTRUCTION CO. LTD

WESTERN HOUSE, HITCHIN, HERTS.

an
ACCURATE
Indicating Thermostat
This Instrument which has a differential of 1% of the scale range and is fitted with 5 amp Micro Switch, is available within the range of -240°F to +400°F.
The ACCURATE RECORDING INSTRUMENT Co
(ARIC LTD)
ARIC WORKS . GARTH ROAD . LOWER MORDEN . SURREY . DERwent 2211/2/3

PUBLISHERS' NOTICE

The "Gas Journal" is published every Wednesday, price 1/3d.; by post 1/5d.

Subscription Rates: Home and Empire :- 52/- per annum; Foreign :- 60/- per annum. (Both payable in advance.) A copy of the "Gas Journal" Calendar & Directory is presented each year to continuous subscribers.

Classified Advertisements: All small classified advertisements are charged at 1/9 per line (approx. 7 words) - minimum charge 10/6. A Box Number address occupies 2 lines, and a further 6d. is charged towards cost of postage on replies. Copy must be received by first post on Monday to ensure insertion in that week's Journal.

Displayed Advertisements: Rates obtainable on application to the Business Manager. Change of copy for displayed spaces must be received 14 days prior to publication if proofs are required. Type area of inside pages 10" deep x 7" wide; block screen 120.

BUSINESS MANAGER: S. T. CULLEN

MIDLANDS OFFICE: 10, Union Street, Birmingham.

NORTHERN MANAGER: W. Q. Foster, 33, St. Helens Road, Harrogate. 'Phone: Harrogate 84291.

WALTER KING, LTD., 11, Bolt Court, Fleet Street, London, E.C.4.

Telephone: CENtral 2236-7. Telegrams: Gasking, Fleet, London.

OXIDE

DUTCH AND DANISH BOG ORE
SPECIALLY ACTIVATED OXIDE OF IRON

Oxide supplied on loan or sale outright.
Highest prices paid for Spent Oxide.

Send your enquiries to

GAS PURIFICATION & CHEMICAL COMPANY LIMITED

ESTABLISHED 1873

PALMERSTON HOUSE, OLD BROAD STREET, LONDON, E.C.2.

Telegrams: "Purification, Stock, London." Telephone: London Wall 5077

THE SKIMASTER MOBILE OFFICE

Fully mobile units, yet needing only one quick loading trailer for a fleet of Skimasters. Prices from £165.
Send for illustrated lists.

STEPHENSON DEVELOPMENTS (HUDD.) LTD.

Grosvenor Works, Linthwaite, Huddersfield, S.4, and Ludgate Gardens, London, E.C.4.

THE BRITISH GAS PURIFYING MATERIALS CO., LTD.

NATURAL BRITISH.

BOG (DUTCH and DANISH) ORE.

SPENT OXIDE.

LONDON ROAD, LEICESTER.

Telegrams: "BRIPURIMAT"

Telephone: 59086

FIRE!

MY LIFE LOST BUT FOR

NU-SWIFT!

"A match struck...an explosion... petrol-sprayed I became a living torch... but my 13-year old Nu-Swift Extinguisher saved me from agonizing death." Everyone has too many fire risks. What would you have done?

NU-SWIFT LTD. • ELLAND • YORKS

In Every Ship of the Royal Navy

"KLEENOFF" *

THE COOKER CLEANER

"KLEENOFF"

FIBRE BRUSHES

RUBBER MOPS

KETTLE DESCALER*

(NEW "KLEENOFF" PRODUCT)

* For resale to the public, and in bulk for Works use

BALE & CHURCH, LTD.

7, CROMPTON WAY, CRAWLEY, SUSSEX.

APPOINTMENTS VACANT

The engagement of persons answering these advertisements must be made through a Local Office of the Ministry of Labour or a Scheduled Employment Agency if the applicant is a man aged 18-64 inclusive or a woman aged 18-59 inclusive unless he or she, or the employment, is excepted from the provisions of the Notification of Vacancies Order, 1952.

NORTH WESTERN GAS BOARD

MANCHESTER GROUP

DRAUGHTSMEN, DISTRIBUTING DEPARTMENT

APPLICATIONS are invited from suitably qualified persons for the above pensionable appointments at salaries within Grade A.P.T. VII (£525-£605 per annum).

Applicants should have a knowledge of the design and layout of distributing plant, including boosting and governor systems and the maintenance of plan records. They should possess the Higher National Certificate of the Institution of Mechanical Engineers, or hold a similar qualification.

Detailed applications, endorsed 'Draughtsmen', giving the names of two referees, should reach the General Manager, North Western Gas Board (Manchester Group), Town Hall, Manchester, 2, within fourteen days.

NORTH WESTERN GAS BOARD

LIVERPOOL GROUP

GROUP ACCOUNTANT

APPLICATIONS are invited for the above pensionable appointment at a salary from £1,500 to £1,750 per annum, according to qualifications and experience.

Applicants must possess a professional qualification and should have had extensive accountancy and administrative experience, with a wide knowledge of machine accountancy systems. The Group supplies over 300,000 consumers.

Application should be made on the official form obtainable by writing to the Chief Personnel Officer, 18/26, Bold Street, Liverpool, 1, and should be returned to him within fourteen days of the publication of this advertisement.

EAST MIDLANDS GAS BOARD

LINCOLNSHIRE DIVISION

GROUP ACCOUNTANT—BOSTON

APPLICATIONS are invited from suitably qualified ACCOUNTANTS for the above appointment. The duties will involve responsibility for the supervision of the Accounting work in the Group and the preparation of final accounts. The salary range will be £595-695 (A.P.T. IX) per annum, the commencing salary to be determined in accordance with the experience and qualifications of the successful candidate.

The post is superannuable and the successful candidate may be required to pass a medical examination.

Applications, stating age, education, qualifications, experience, present appointment and salary, together with the names of two referees, should be sent to the undersigned, to be received not later than December 12, 1952.

A. GWYNNE DAVIES,
Secretary.

Beverley House,
University Road,
Leicester.
November 25, 1952.

EAST MIDLANDS GAS BOARD

LEICESTER & NORTHANTS DIVISION

SHOWROOM SUPERINTENDENT—NORTHAMPTON UNDERTAKING

APPLICATIONS are invited from suitably qualified persons for the position of Showroom Superintendent at the Northampton Undertaking.

Applicants must have had considerable experience of Showroom supervision, appliance sales and consumer service, and be well versed in window and general display practice.

The appointment will be made in Grade A.P.T. VIII (£565-£645 per annum) and the commencing salary will be in accordance with the experience and qualifications of the person appointed.

The post is superannuable and the successful candidate may be required to pass a medical examination.

Applications stating age, experience and qualifications and giving the names of two referees should be addressed to Mr. J. Corrigan, Senior Group Manager, 45, Abingdon Street, Northampton, to be received not later than Wednesday, December 17, 1952.

H. B. TAYLOR,
Divisional General Manager.

Gas Offices,
Millstone Lane,
Leicester.
November 27, 1952.

(*Classified advertisements continued on Supplement* 4)

APPOINTMENTS VACANT (ctd.)

SOUTH WESTERN GAS BOARD

NORTHERN DIVISION

PUBLICITY OFFICER

APPLICATIONS are invited from highly qualified persons for this position and applicants should possess an exceptionally wide experience in public relations.

The duties will include attending meetings and preparing press articles, editing the Board's "News Sheet," planning advertising campaigns, preparation of lay-out in connection with all classes of advertising literature and organisation and planning of exhibitions.

The salary will be commensurate with qualifications and responsibility. Applicants should indicate the salary required.

Applications should be sent in by December 15, to: W. J. Baker, Divisional Manager, South Western Gas Board, Radiant House, Bristol, 1.

THE GAS COUNCIL

INDUSTRIAL GAS DEVELOPMENT OFFICER

THE GAS COUNCIL invite applications for the appointment of INDUSTRIAL GAS DEVELOPMENT OFFICER. The duties will be those of executive officer to the Council's Industrial Gas Development Committee, whose function is to assist the twelve Area Gas Boards in promoting the efficient application of gas to industrial processes. Possession of a recognised technical qualification, sound knowledge and experience of fuels and of heat treatments, ability to conduct negotiations with other organisations and facility in the preparation of concise and accurate reports are essential.

The salary will be at the rate of not less than £1,500 a year and the appointment will be pensionable. The successful candidate will be required to pass a medical examination.

Applications giving full particulars of age, experience and other qualifications should reach the Secretary, The Gas Council, 1, Grosvenor Place, London, S.W.1, by January 10, 1953.

SOUTH BRISBANE GAS AND LIGHT COMPANY, LIMITED

QUEENSLAND, AUSTRALIA

ENGINEER AND MANAGER FOR WORKS

APPLICATIONS are invited from qualified Gas Engineers up to the age of 45 years for the position of ENGINEER AND MANAGER for Works with likely advancement following satisfactory service. Applicants must have a sound training in modern Carbonising Practice and practical experience in the operation and planning of medium sized Gas Works. Experience with Continuous Verticals of advantage.

Initial salary to be at the rate of £A1,150 to £A1,500 per annum in accordance with qualifications. Present output approximately 800,000,000 per annum.

Attractive Staff Superannuation Scheme in operation.

No residence is provided with position but an unfurnished residence is available until the appointee secures suitable premises. The Company would make reasonable contribution towards removal expenses.

Successful applicant to pass medical examination. From information available cost of living in Australia is approximately the same as in England.

Applications setting out age, qualifications and experience accompanied by *copies* of references and recent photograph and endorsed 'Application for Engineer and Manager for Works' will be received by the undersigned up till January 31, 1953.

W. H. SHEDDEN,
General Manager and Engineer,

305, Stanley Street,
South Brisbane.

JERSEY GAS LIGHT CO., LTD.

WORKS FOREMAN

APPLICATIONS are invited from suitably qualified persons for the position of WORKS FOREMAN. Applicants must be Engineers to trade and should have knowledge and experience of the Operation, Maintenance and Repair of Gas Works Plant and the handling of men. Experience with Woodall-Duckham Vertical Retorts would be an advantage.

The successful applicant may be required to pass a medical examination, and will be required to live on the Works with rent, rates, fuel and lighting free and the salary offered is £450 per annum.

Applications giving details of experience, positions held (ex-Service men should state rank held) with *copies* of Testimonials should reach the undersigned within ten days of the publication of this advertisement.

S. P. PEPIN,
Managing Director.

97, Bath Street,
Jersey,
Channel Islands.
November 27, 1952.

PLANT FOR SALE & WANTED

FOR SALE:—2 ROTARY VACUUM FILTERS by Davey Paxman. Twin drums 8 ft. dia. × 5 ft. wide, each 125 sq. ft. filter area. Each complete with vacuum and filtrate pumps, blower, condenser, filtrate tanks, motor, etc.

5,000 ft. each CAST IRON Flanged Pipe, 6 in. and 8 in. bore.

11,000 ft. ALUMINIUM TUBE 4½ in. OD by 8's gauge. Solid drawn.

3,500 ft. ALUMINIUM TUBE 1¼ in. OD by 8's gauge. Solid drawn.

28—ALUMINIUM Tubed Condensers. 149—⅝ in. OD tubes. 9 ft. 10 in. long.

7—ALUMINIUM Tubed Condensers. 386—⅜ in. OD tubes. 14 ft. long.

2—STAINLESS STEEL 2,100 galls. Open Top Tanks. 7 ft. dia. × 8 ft. 6 in.

12—MILD STEEL 1,100 galls. Riveted Receivers, 80 lbs. w.p.

HUBERT JONES, LTD.

Cobden Street,
Pendleton,
Salford, 6.
Tel.: PEN 1373/4.

WANTED:—Scrap and redundant MOTOR TYRES. Top prices paid.—Ferdix Rubber (London), Limited, Rowland House, 6, Eldon Street, London, E.C.2. *Tel.*: BIShopsgate 2010.

WANTED:—REGULAR SCRAP GAS METERS AND PARTS. Best prices paid. Offers to:—Mitcham Smelters Ltd., Red House Road, Croydon, Surrey. *Tel.*: THOrnton Heath 6101 (Private Branch Exchange).

PUBLICATIONS

GAS ACCOUNT CALCULATORS

SUPPLIED either by Price per Therm or Thousand, for any specified Calorific Value, in book form, office charts, or pocket charts for Meter Inspectors, printed in clear type. Write for particulars to F. H. WAKELIN, LTD., Calculator Specialists, 354, WHEELER STREET, BIRMINGHAM.

'Phone: Northern 0989. 'Grams: Reckoners, B'ham.

MISCELLANEOUS

W. C. HOLMES & Co., Ltd., have erecton available at short notice for the installation or repair of Gas Works plant.

Work can be carried out on a contract or daywork basis as required.

Structural Steel Erectors are also available.

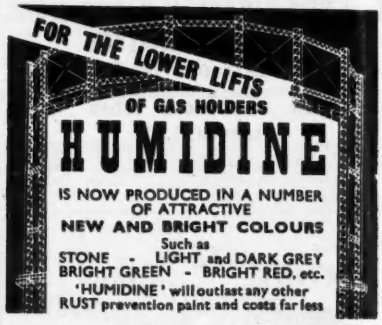
W. C. Holmes & Co., Ltd., Turnbridge, Huddersfield.

Telephones: Huddersfield 5280.
London, Victoria 9971.
Birmingham, Midland 6830.

SMALL single truckloads and larger quantities of good ROUGH BREEZE from any gasworks, large or small, in the United Kingdom required by merchants paying own railway tolls. Cash price and particulars to No. 9378, *Gas Journal*, 11, Bolt Court, Fleet Street, London, E.C.4.

PATENTS

KINGS PATENT AGENCY, LTD.
(Director, B. T. King, A.I.M.E., Patent Agent). Advice, Handbook, and Consultations free. 146a, Queen Victoria Street, London, E.C.4. 'Phone: City 6161.


FOR THE LOWER LIFTS
OF GAS HOLDERS
HUMIDINE
IS NOW PRODUCED IN A NUMBER OF ATTRACTIVE
NEW AND BRIGHT COLOURS
Such as
STONE - LIGHT and DARK GREY
BRIGHT GREEN - BRIGHT RED, etc.
'HUMIDINE' will outlast any other
RUST prevention paint and costs far less

WRITE FOR SAMPLES OF SHADES and further details to the sole makers

ASPINALLS (PAINTS) LTD.

CARLETON - SKIPTON - YORKS.

'Phones: SKIPTON 548/9,

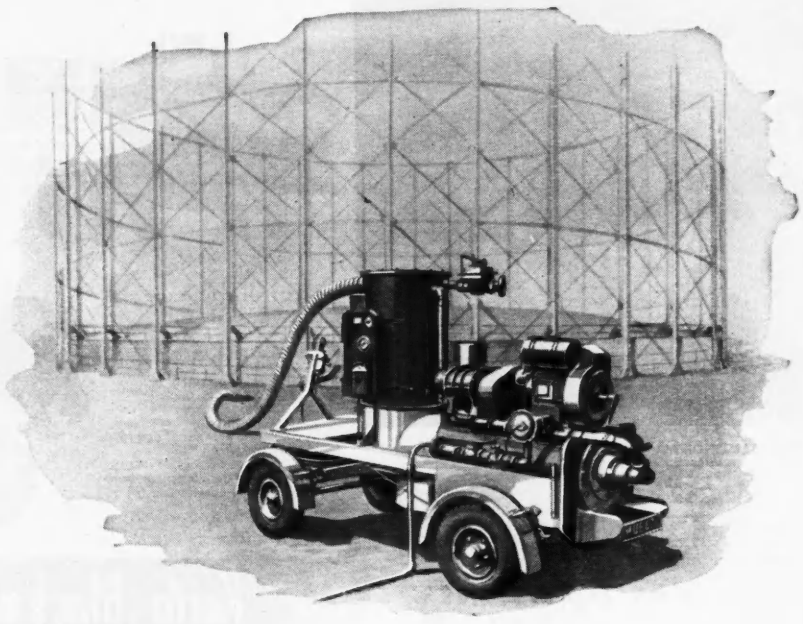
ndh 567

STRINGER BROTHERS

ALBION WEST BROMWICH

S.B IRON & STEEL PLATES & SHEETS BARS & SECTIONS

Telephone: WEST BROMWICH 0436-7



INERT GAS GENERATORS

THESE machines were first introduced into this country in 1934, to meet the need for purging Gas Works plant and mains. Such a procedure has become increasingly recognised by the Industry as a desirable safety measure prior to repair work and to routine purifier operations.

Two types are available, one for oil firing and the other for gas firing and either can be supplied as a static or mobile unit.

W. C. HOLMES & CO. LTD.

HUDDERSFIELD · LONDON · BIRMINGHAM

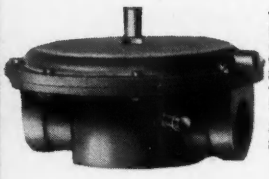
Tel: Huddersfield 5280 London: Victoria 9971 Birmingham: Midland 6830

HOLMES HUDDERSFIELD

C406

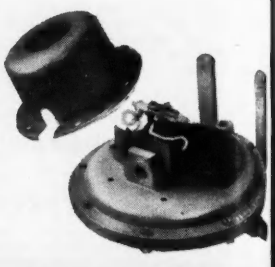
controlling gas supplies

FOR CONTROLLING THE QUALITY OF AIR/GAS MIXTURE *irrespective of varying pressures and resistances. Temperature control is varied by manipulation of the air cock only.*
CAPACITY RANGE: *from 130 to 1,380 cub. ft. of gas per hour according to air pressure (¼ lb. to 1 lb.) and size. For low pressure gas systems.*
AIR INLETS: *1", 1¼", 1½" and 2" dias. gas thread.*



THE SINGLE DIAPHRAGM AUTOMATIC SHUT-OFF VALVE *(illustrated left) automatically closes the gas supply in the event of pressure dropping below a predetermined point. Not until all burner cocks on the outlet have been shut and gas pressure restored is it possible to re-open the valve. This appliance is for operation on systems handling 150 to 2,400 cub. ft. of low pressure gas per hour.*

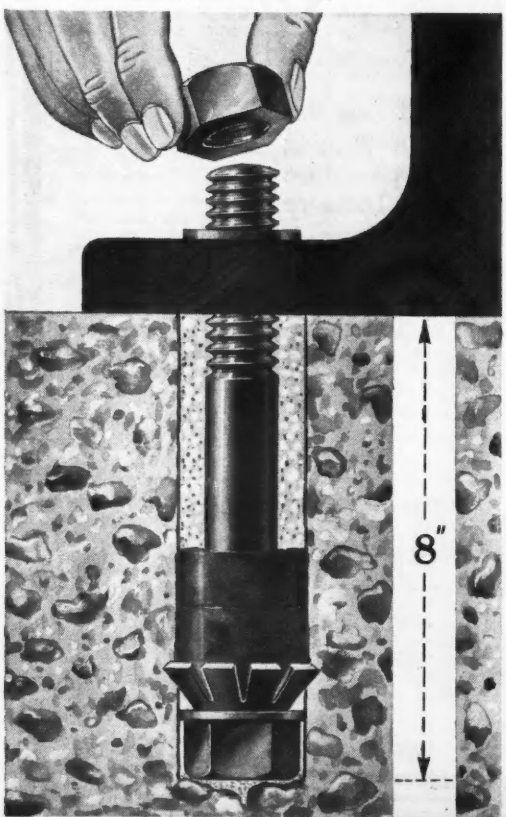
THE AUTOMATIC CUT-OFF SWITCH, *illustrated right, automatically breaks the electric supply to motor-driven gas boosters or compressors if low pressure gas falls below a predetermined pressure.*
RANGE: *Type 1 operates between .2" and 1.2" w.g. pressure.*
Type 2 operates between 1.2" and 5" w.g. pressure.
Type 3 operates between 5" and 15" w.g. pressure.
Additional applications include its use as (a) an air flow switch in conjunction with a flame failure device and (b) a gas meter protector.



INDUSTRIAL GAS EQUIPMENT

Keith Blackman LIMITED
MILL MEAD ROAD, TOTTENHAM, LONDON, N.17
Phone: Tottenham 4511 (twelve lines) Grams: "Keithblac, Norphone, London"
BRANCH OFFICES: AT MANCHESTER, BIRMINGHAM, LEEDS, GLASGOW, NEWCASTLE-ON-TYNE, PENARTH near CARDIFF, AND BELFAST

522/2/GI



THIS BOLT (1¼" DIAMETER) FIXED AND CAULKED IN CONCRETE

in 20 minutes!

The Rawlplug Bolt Anchor is a fixing we supply for Heavy Duty Work especially where there is Vibration or Shock-loading—immensely strong, and easily caulked to withstand wet conditions. In this test the hole was drilled (8" deep x 2⅛" diameter) with a Rawlplug P.H. Bit in a pneumatic hammer, and caulked with a standard Rawlplug Caulking Tool. Concrete characteristics and working conditions vary so widely that it is impossible to generalise about times, but this test affords striking evidence of the extraordinary speed of the Rawlplug method as compared with any other—no grouting, no waiting for cement to dry.

Write for Publication No. BA1373 which gives technical information, and if you have a fixing problem, please give details. Our Technical Service Dept. will be delighted to advise you, without charge.

RAWLPLUG WALL PLUGS

FIXING DEVICES

B423
THE RAWLPLUG CO LTD · CROMWELL ROAD · LONDON · SW

Printed by STRAKER BROTHERS LTD., E.C.2, for WALTER KING LIMITED, 11, BOLT COURT, FLEET STREET, LONDON, E.C.4. Wednesday, December 3, 1952

What's in a Name..?

In this case something worth noting. Continuous research, carried out on our own full-scale gas works; testing gas-making coals, studying problems of retort and setting construction, checking materials used on Glover-West installations, designing new equipment to increase retort house efficiency. A progressive approach to the job of producing efficient carbonization plant. We are not static. Our aim, in a word, is improvement.

West's Gas

IMPROVEMENT COMPANY LIMITED

ALBION IRONWORKS · MILES PLATTING · MANCHESTER 10

Telephone: COLlyhurst 2961 Telegrams: Stoker, Manchester

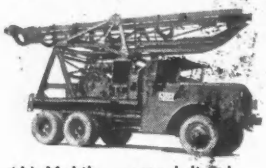
London Office: Columbia House, Aldwych, W.C.2. Telephone: HOLborn 4108-9 Telegrams: Wesgasco, Estrand

R I

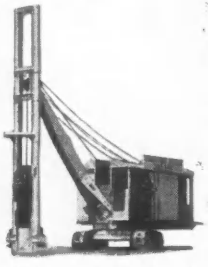
WEST'S-PILING

PROVIDES SECURE FOUNDATIONS FOR ANY STRUCTURE

PLANT FOR DRIVING OUR SPECIALISED SYSTEM OF PILING.

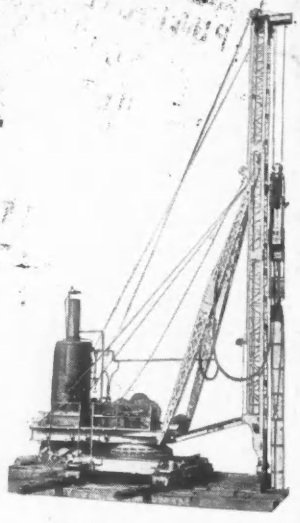


(A) Mobile petrol-diesel outfit for small contracts.
2-ton Drop Hammer.



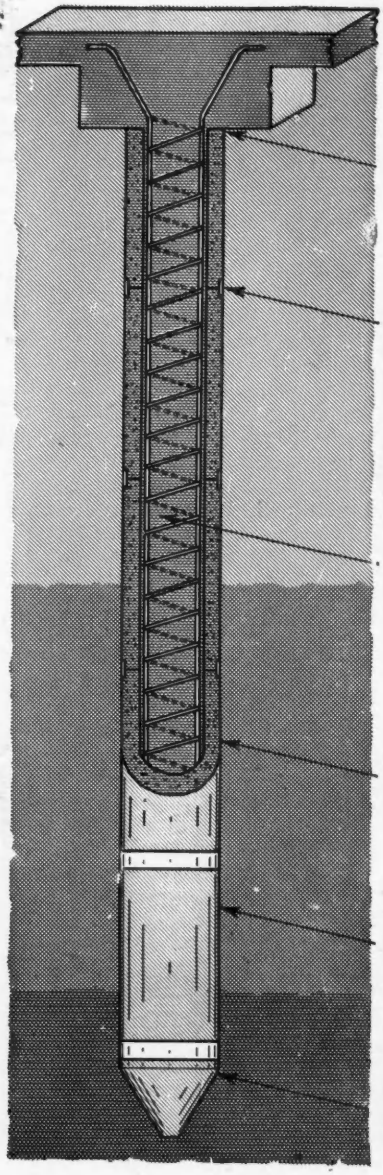
(B) Small mobile diesel outfit for undulating sites.
3-ton Drop Hammer.

(C) Medium mobile diesel outfit for undulating sites.
3-ton Drop Hammer.



(D) Typical steam frame for extensive sites.
4-ton Steam Hammer.

(E) Large mobile diesel outfit for undulating sites.
3-5 ton Drop Hammer.



SPECIAL FEATURES

TOP PILE SHELL ONLY CUT TO SUIT PILECAP

WATERTIGHT STEEL BAND AT JOINTS BETWEEN STANDARD LENGTH PILE SHELLS

CONCRETE CORE AND STEEL REINFORCEMENT NOT FATIGUED AS IT IS PLACED AFTER SET IS OBTAINED

REINFORCED PRECAST CONCRETE SHELLS ENSURING A CONSTANT CROSS SECTION

SKIN FRICTION RETAINED AS INITIAL SET IS NOT DISTURBED

SOLID CONCRETE SHOE TAKES DRIVING STRESS AND PENETRATES INTO LOAD BEARING STRATA

NO WASTAGE — PILE SHELL DRIVEN IN DESIRED

NO COSTLY EXTENSIONS STANDARD SECTIONS TO RESISTANCE

WEST'S PILING & CONSTRUCTION CO., LTD., COLUMBIA HOUSE, ALDWYCH, LONDON, W.C.2

Telephone : HOLBORN 4108

Plant Depot: Bath Road, Harmondsworth, Middlesex. Telephone: West Drayton 2288. *Midland Office:* 83 Edmund Street, Birmingham 3. Telephone: Central 1416.
Northern Office: Albion Ironworks, Manchester 10. Telephone: Collyhurst 3049. *Scottish Office:* 169 Hamilton Road, Glasgow, E.2. Telephone: Shettleston 2927.